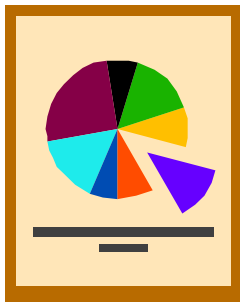
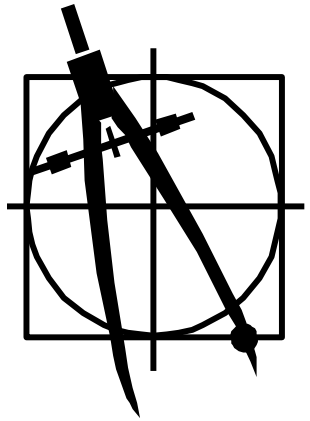
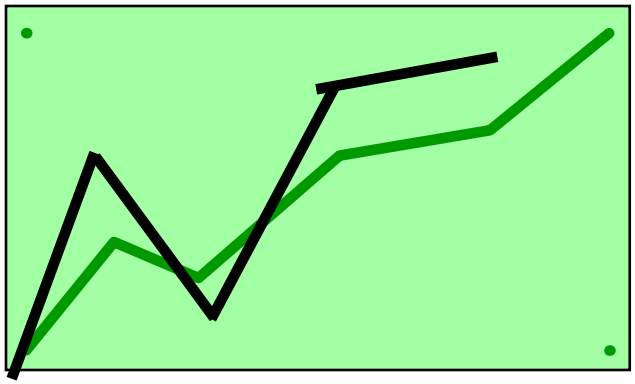




Earned Value
A Practitioner's View



What is Earned Value ?

Earned Value is an "early warning" Program/Project management tool.

Earned Value is an enhancement over traditional measures that focused o
costs and actual costs.

Earned Value goes one step further to examines actual accomplishments
expenditures (planned and actual).

The Terminology of Earned Value

Budgeted Cost of Work Scheduled (BCWS):
The initial cost estimate for a work package scheduled to be completed within a given time period.

Budgeted Cost of Work Performed (BCWP):
The value of the work accomplished on a package during the current reporting period . This value is derived from the initial estimate for a work package.

Actual Cost of Work Performed (ACWP):
The actual cost incurred to complete a work package within a given tim

The Terminology of Earned Value

Cost Variance (CV) is the difference between planned and actual c

CV = BCWP - ACWP.

Schedule Variance (SV) is the difference between the amount of w
to be performed and the work that was actually completed:

SV = BCWP - BCWS.

Cost Performance Index (CPI):
Indicates how efficiently the project team has turned costs into progress to date.

CPI = (BCWP/ACWP).

It is a historic measure of average productivity over the life of the project.

Earned Value: An Example of Measurement Objectivity

The Plan

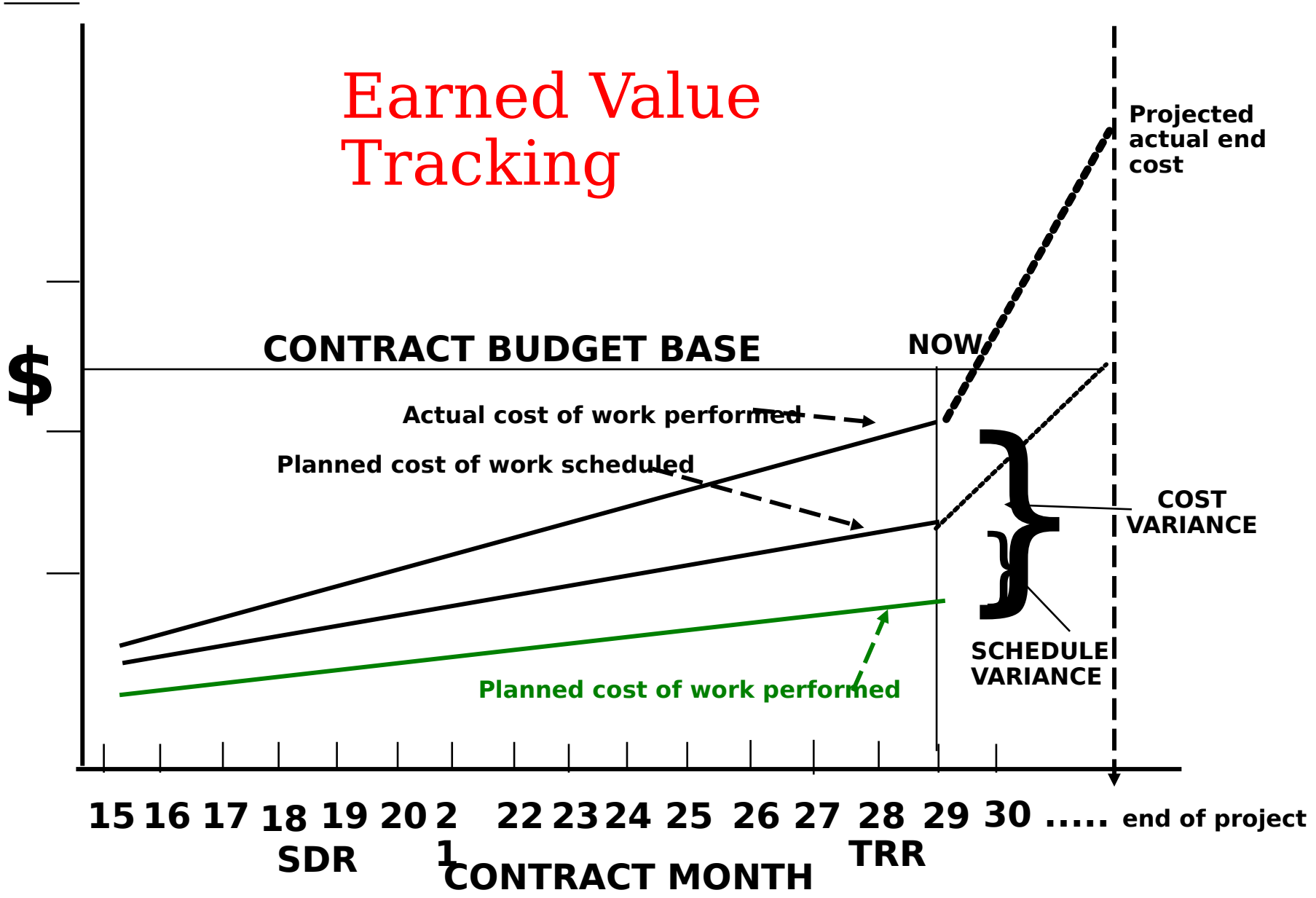
	1	2	3	4	Total
Budgeted Cost of Work Scheduled (BCWS) e.g., the Work Planned ($)	**25**	**25**	**25**	**25**	**100**

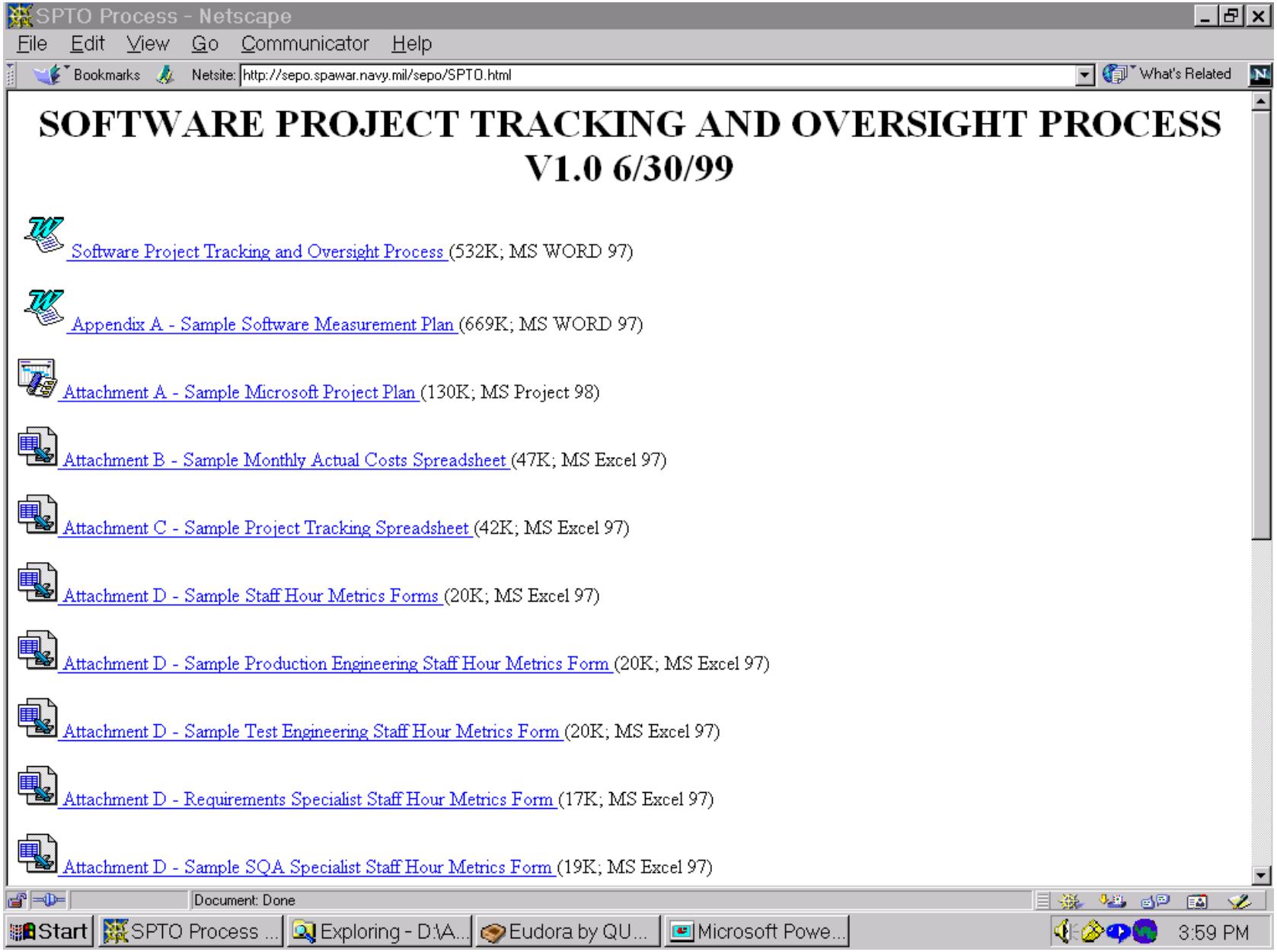
How much I spent

	1	2	3	4	Total
(BCWS) Work Planned ($)	25	25	25	25	100
Actual Cost of Work Performed (ACWP) e.g., Actual Cost ($)	**22**	**20**	**25**	**25**	**92**

How much I should have spent

	1	2	3	4	Total
(BCWS) Work Planned ($)	25	25	25	25	100
Budgeted Cost of Work Performed (BCWP) e.g., Accomplished Value ($)	**20**	**20**	**20**	**20**	**80**
(ACWP) Actual Cost ($)	22	20	25	25	92


Earned Value Tracking
Projected actual end cost
$
CONTRACT BUDGET BASE
NOW
Actual cost of work performed
Planned cost of work scheduled
COST VARIANCE
SCHEDULE VARIANCE
Planned cost of work performed
15 16 17 18 19 20 2 22 23 24 25 26 27 28 29 30 ..... end of project
SDR
1
TRR
CONTRACT MONTH


SPTO Process - Netscape
File Edit View Go Communicator Help
Bookmarks Netsite: http://sepo.spawar.navy.mil/sepo/SPTO.html
What's Related
SOFTWARE PROJECT TRACKING AND OVERSIGHT PROCESS
V1.0 6/30/99
Software Project Tracking and Oversight Process (532K; MS WORD 97)
Appendix A - Sample Software Measurement Plan (669K; MS WORD 97)
Attachment A - Sample Microsoft Project Plan (130K; MS Project 98)
Attachment B - Sample Monthly Actual Costs Spreadsheet (47K; MS Excel 97)
Attachment C - Sample Project Tracking Spreadsheet (42K; MS Excel 97)
Attachment D - Sample Staff Hour Metrics Forms (20K; MS Excel 97)
Attachment D - Sample Production Engineering Staff Hour Metrics Form (20K; MS Excel 97)
Attachment D - Sample Test Engineering Staff Hour Metrics Form (20K; MS Excel 97)
Attachment D - Requirements Specialist Staff Hour Metrics Form (17K; MS Excel 97)
Attachment D - Sample SQA Specialist Staff Hour Metrics Form (19K; MS Excel 97)
Document: Done
Start
SPTO Process ...
Exploring - D:\A...
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Microsoft Powe...
3:59 PM

SPTO Process - Netscape

File Edit View Go Communicator Help

Bookmarks Netsite: http://sepo.spawar.navy.mil/sepo/SPTO.html What's Related

Attachment D - Sample Test Engineering Staff Hour Metrics Form (20K; MS Excel 97)

Attachment D - Requirements Specialist Staff Hour Metrics Form (17K; MS Excel 97)

Attachment D - Sample SQA Specialist Staff Hour Metrics Form (19K; MS Excel 97)

Attachment D - Sample SCM Specialist Staff Hour Metrics Form (20K; MS Excel 97)

Attachment E - Sample Status Data Collection Forms (36K; MS Word 97)

Attachment F - Sample Planning Data Collection Forms V3.0 09/14/00 (Project Data Form (PDF)) (94K; MS Word 97)

Attachment G - Sample Quarterly Review Requirements V02 8/13/00 (740K; MS Word 97)

Appendix B - An Earned Value Overview (32K; MS Word 97)

Return to Software Project Tracking and Oversight Section of the Software Engineering Processes by KPA subpage.

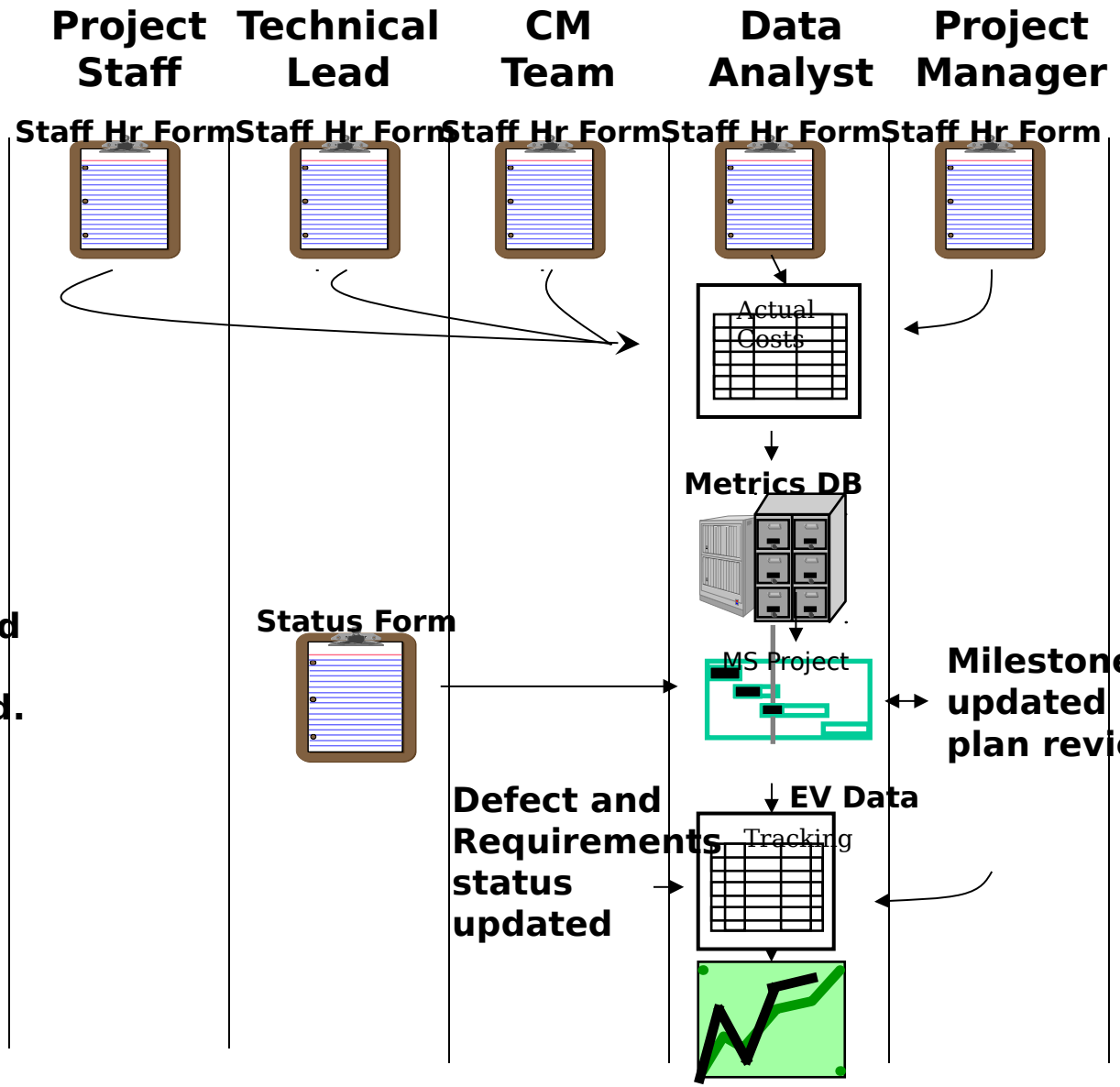
SEPO Return to SEPO Home Page

Please address all inquires to: SEPO
Last update: 14 September 00 - BG

Document: Done

Start SPTO Proce... Exploring - D:\A... Eudora by QU... Microsoft Powe... 4:03 PM

The SMP's Process



Weekly all submit Staff Hour Form (Attachment D)

Weekly costs per task are totaled (Attachment B)

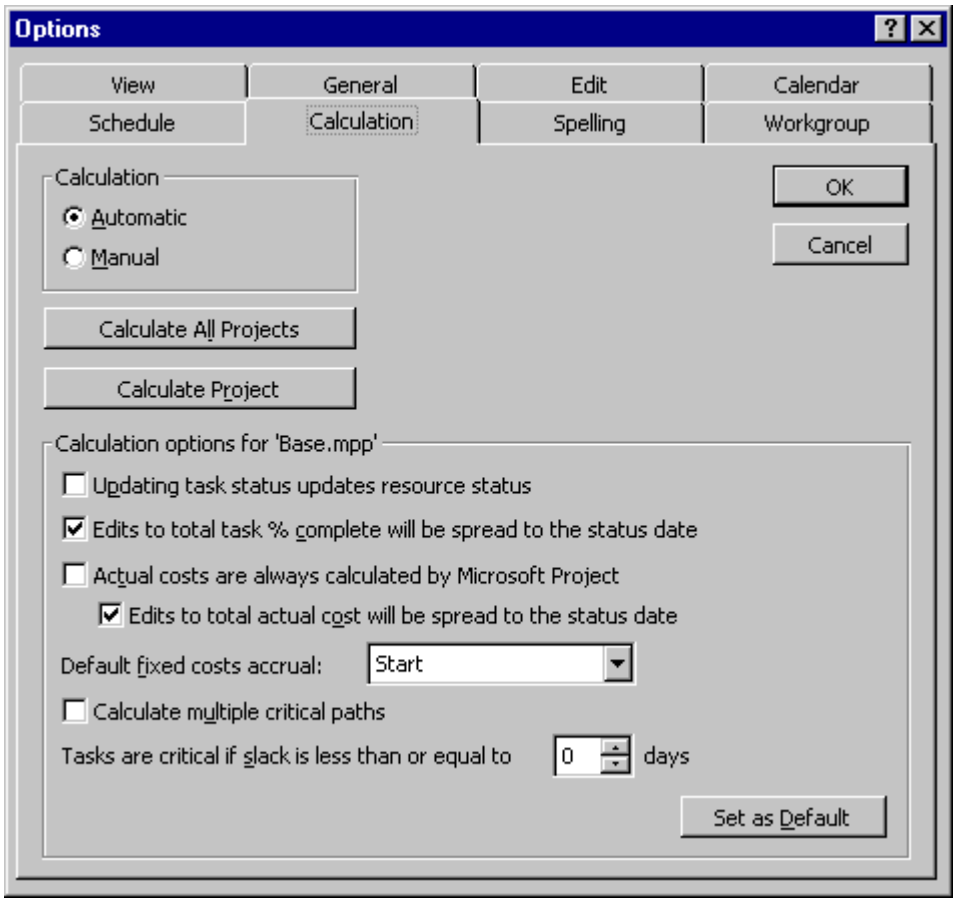
Weekly Staff hours and cost per task are stored in metrics data base

Monthly each tasks earned value (% complete) and accrued costs are updated. (Attachment E-1 & A)

Monthly the Tracking Spreadsheet is updated (Attachment C)

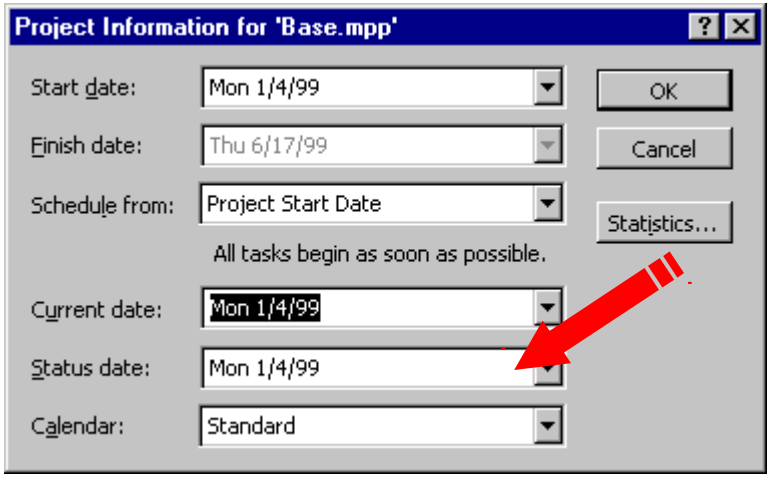
Quarterly graphs are generated.

MS Project



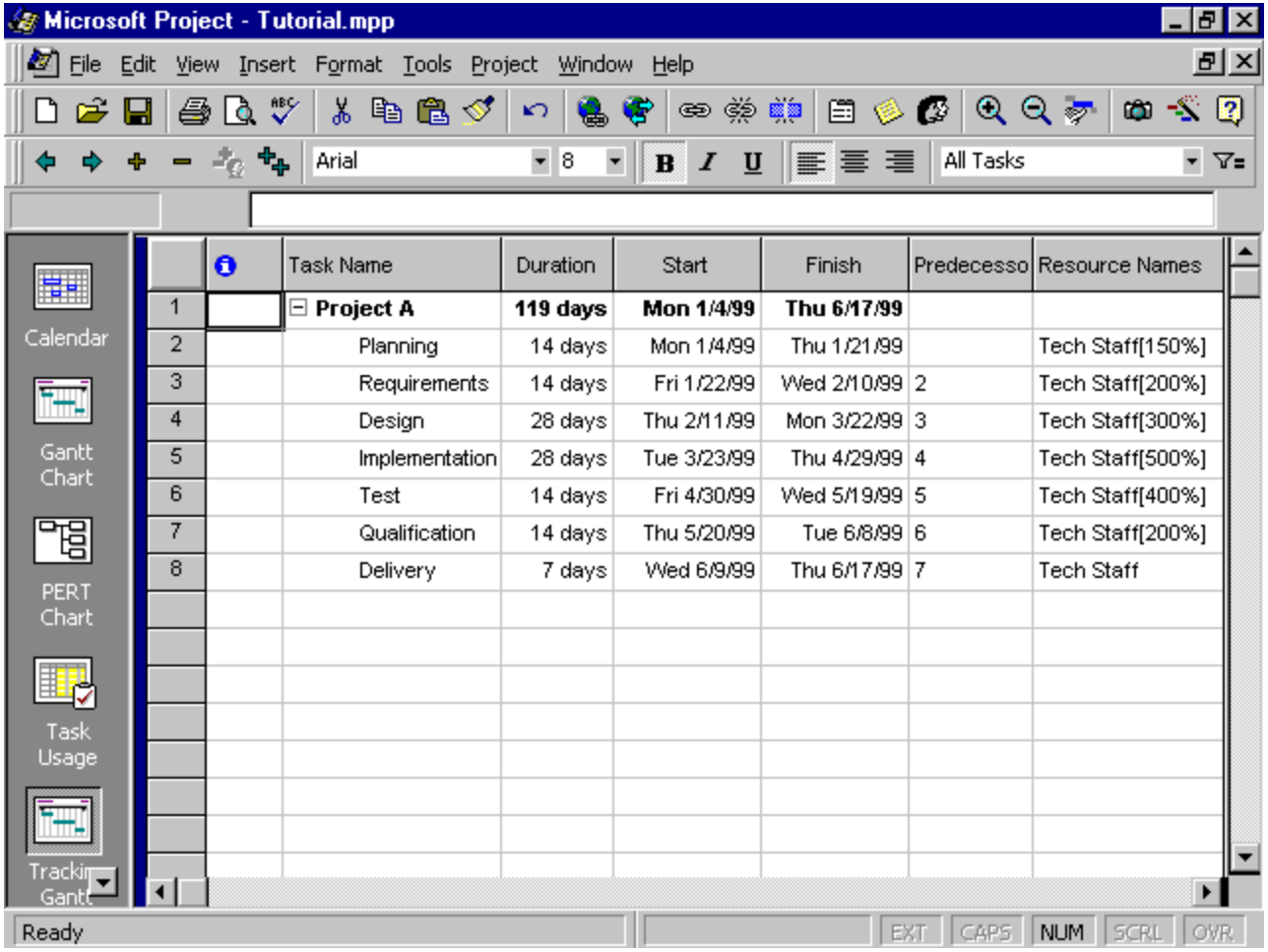
Pull down **Tools** menu
Click on **Options,** chose **Calculation** tab
Set as shown before data entry

MS Project



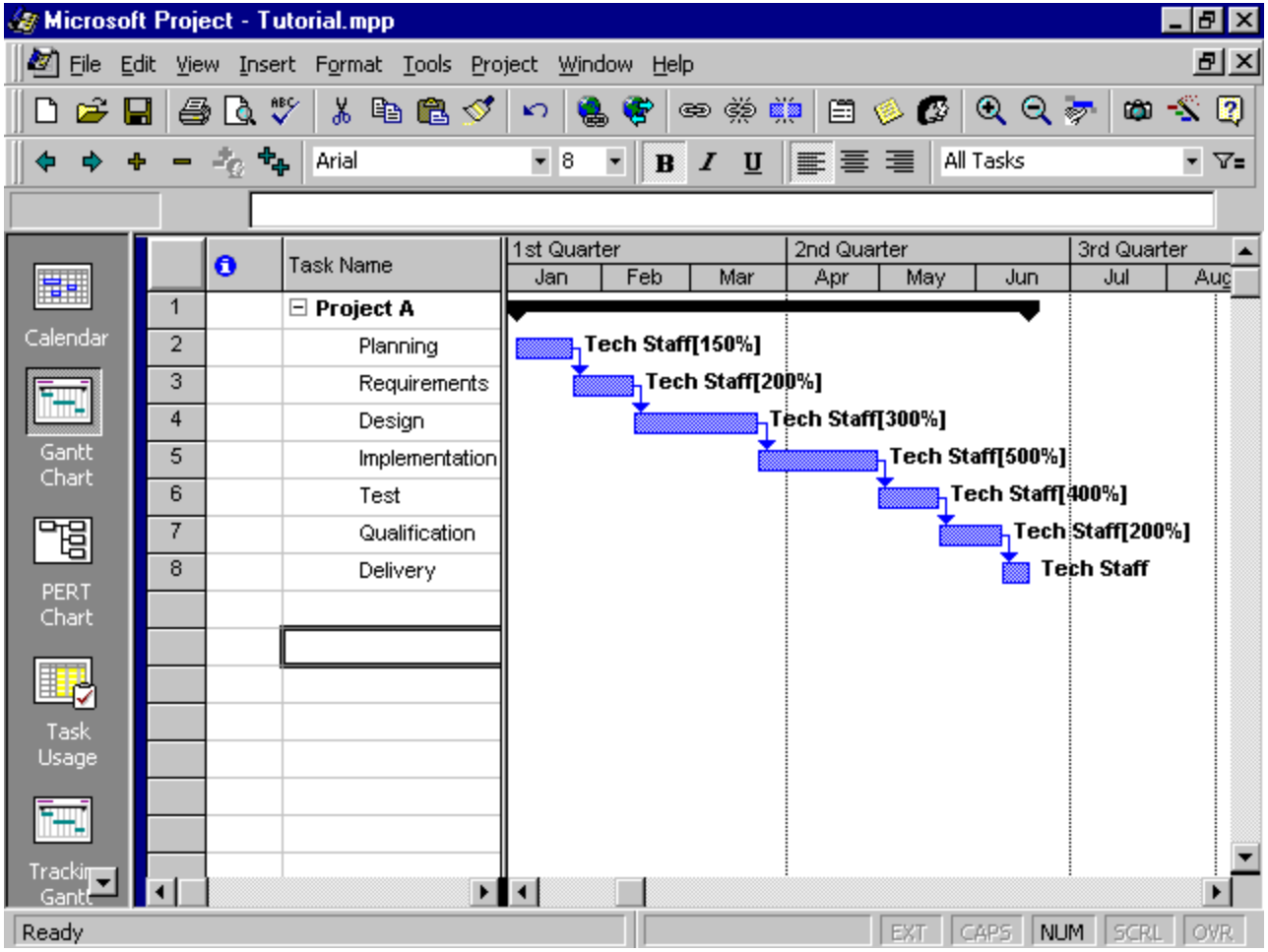
Pull down **Project** menu
Click on **Project Information**
Set key dates at baseline and at each monthly status check point

MS Project


Microsoft Project - Tutorial.mpp
File Edit View Insert Format Tools Project Window Help
Arial 8 All Tasks
Calendar
Gantt Chart
PERT Chart
Task Usage
Tracking Gantt
Task Name | Duration | Start | Finish | Predecesso | Resource Names
1 Project A | 119 days | Mon 1/4/99 | Thu 6/17/99
2 Planning | 14 days | Mon 1/4/99 | Thu 1/21/99 | Tech Staff[150%]
3 Requirements | 14 days | Fri 1/22/99 | Wed 2/10/99 | 2 | Tech Staff[200%]
4 Design | 28 days | Thu 2/11/99 | Mon 3/22/99 | 3 | Tech Staff[300%]
5 Implementation | 28 days | Tue 3/23/99 | Thu 4/29/99 | 4 | Tech Staff[500%]
6 Test | 14 days | Fri 4/30/99 | Wed 5/19/99 | 5 | Tech Staff[400%]
7 Qualification | 14 days | Thu 5/20/99 | Tue 6/8/99 | 6 | Tech Staff[200%]
8 Delivery | 7 days | Wed 6/9/99 | Thu 6/17/99 | 7 | Tech Staff
Ready
EXT CAPS NUM SCRL OVR

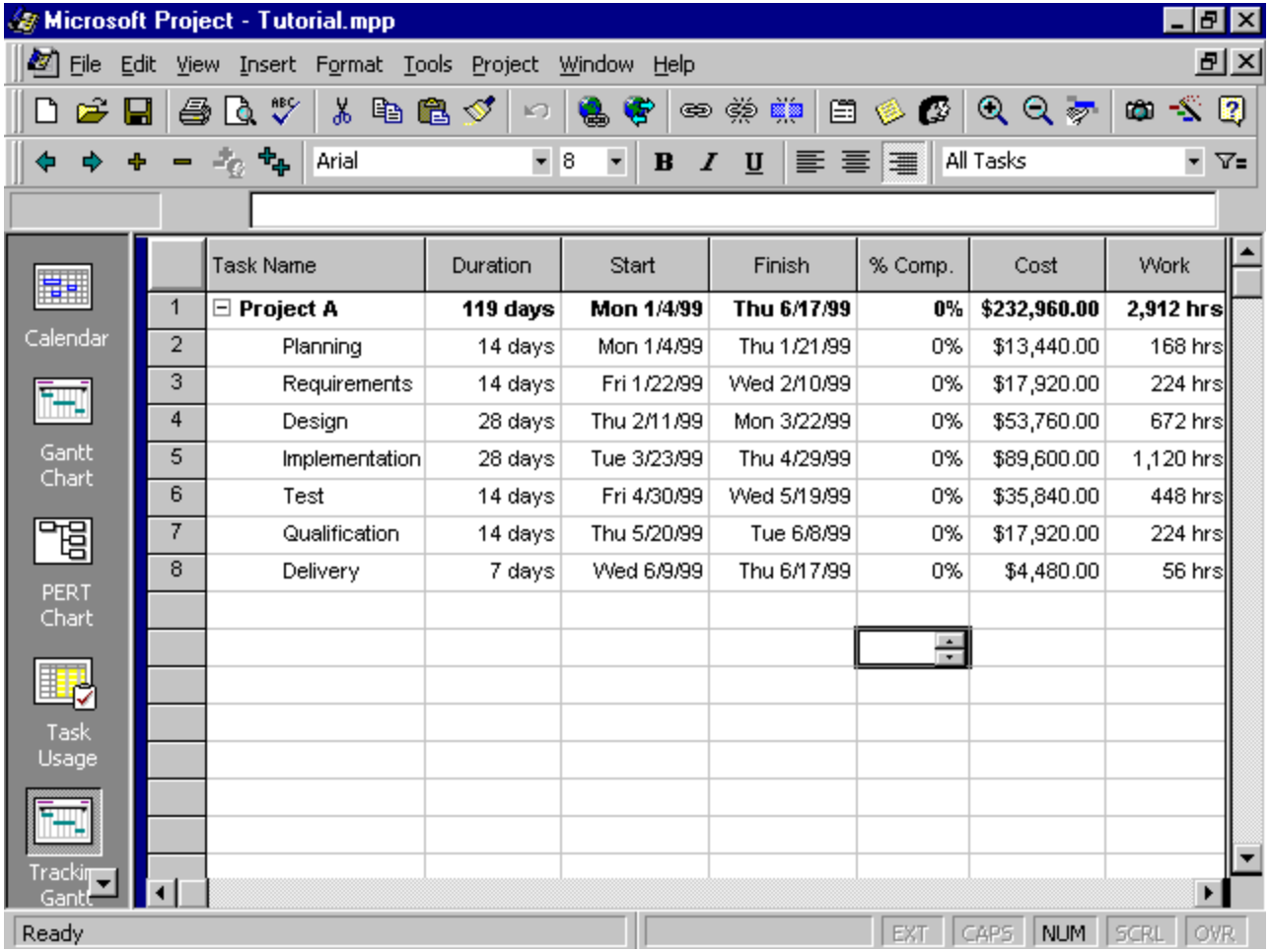
Entry View 1/4/99

MS Project



Gantt Chart View before Baseline set 1/4/99

MS Project

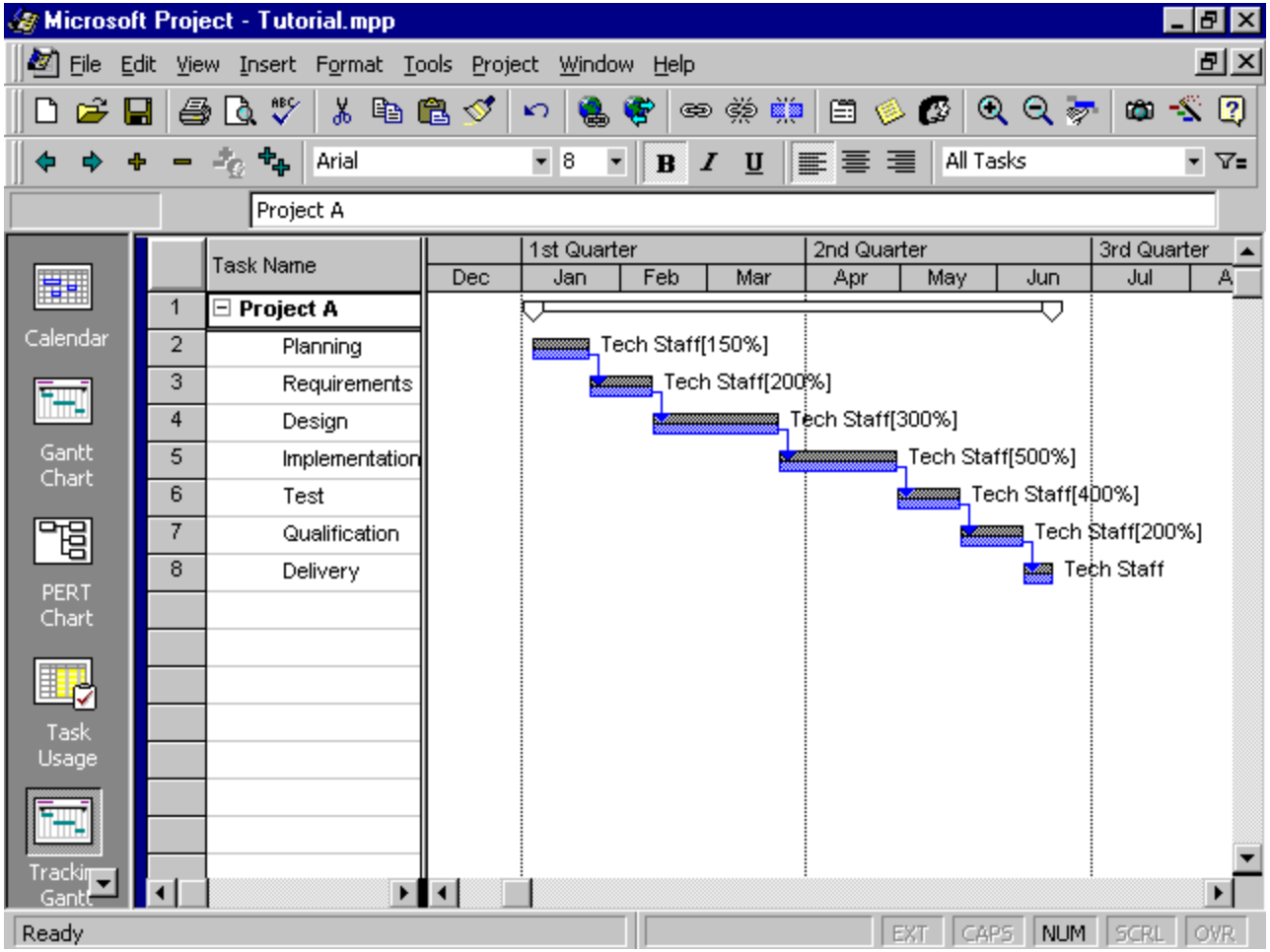


	Task Name	Duration	Start	Finish	% Comp.	Cost	Work
1	**Project A**	**119 days**	**Mon 1/4/99**	**Thu 6/17/99**	**0%**	**$232,960.00**	**2,912 hrs**
2	Planning	14 days	Mon 1/4/99	Thu 1/21/99	0%	$13,440.00	168 hrs
3	Requirements	14 days	Fri 1/22/99	Wed 2/10/99	0%	$17,920.00	224 hrs
4	Design	28 days	Thu 2/11/99	Mon 3/22/99	0%	$53,760.00	672 hrs
5	Implementation	28 days	Tue 3/23/99	Thu 4/29/99	0%	$89,600.00	1,120 hrs
6	Test	14 days	Fri 4/30/99	Wed 5/19/99	0%	$35,840.00	448 hrs
7	Qualification	14 days	Thu 5/20/99	Tue 6/8/99	0%	$17,920.00	224 hrs
8	Delivery	7 days	Wed 6/9/99	Thu 6/17/99	0%	$4,480.00	56 hrs

Summary View after Entry and Baseline 1/4/99

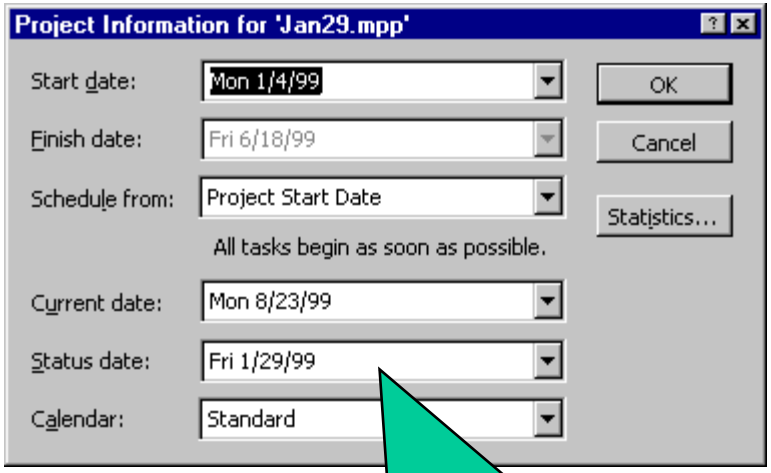
To Baseline pull down **Tools,** select **Tracking,** select **Save Baseline**.

MS Project



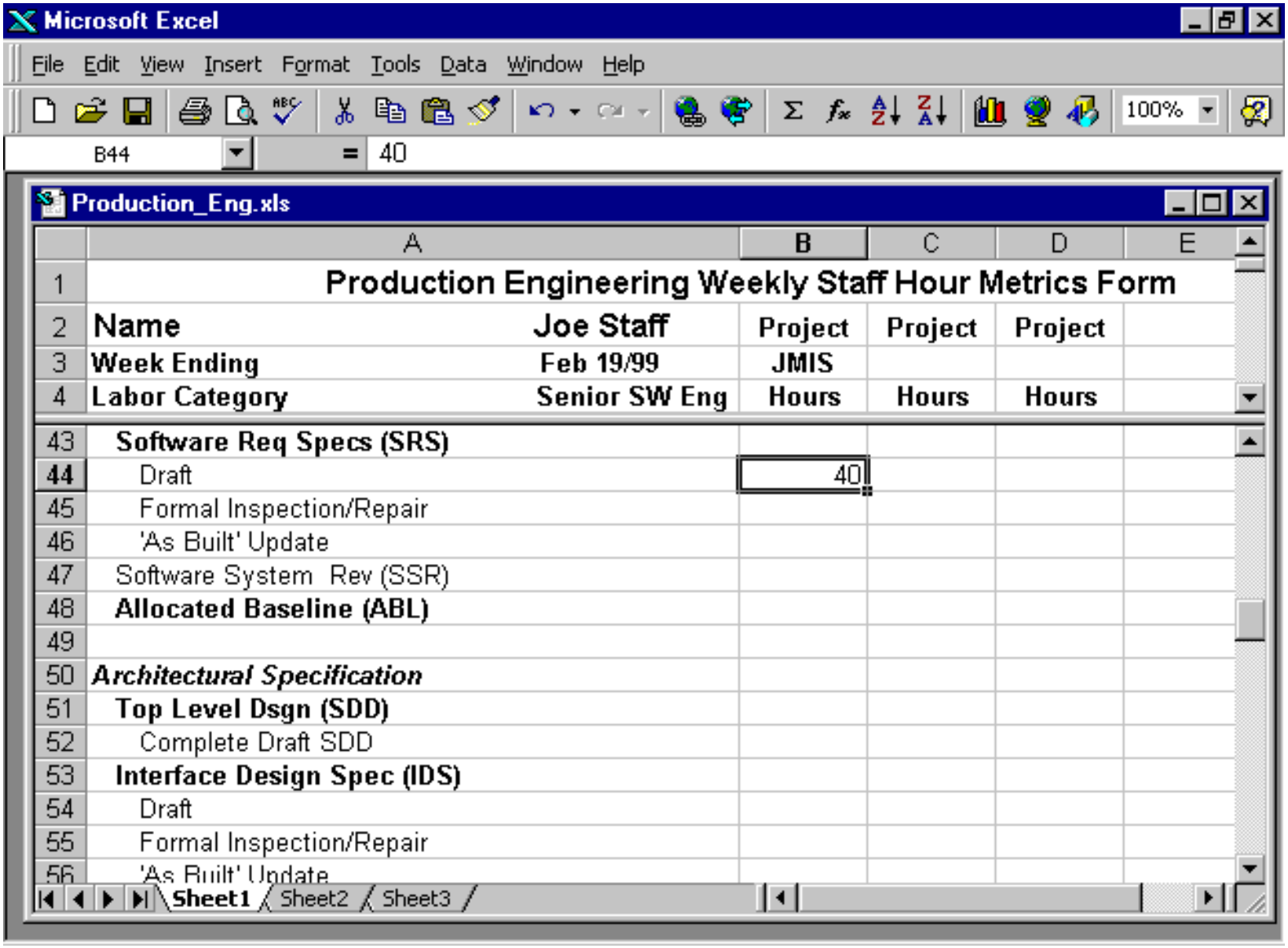
Gantt Chart View w/Baseline 1/4/99

MS Project

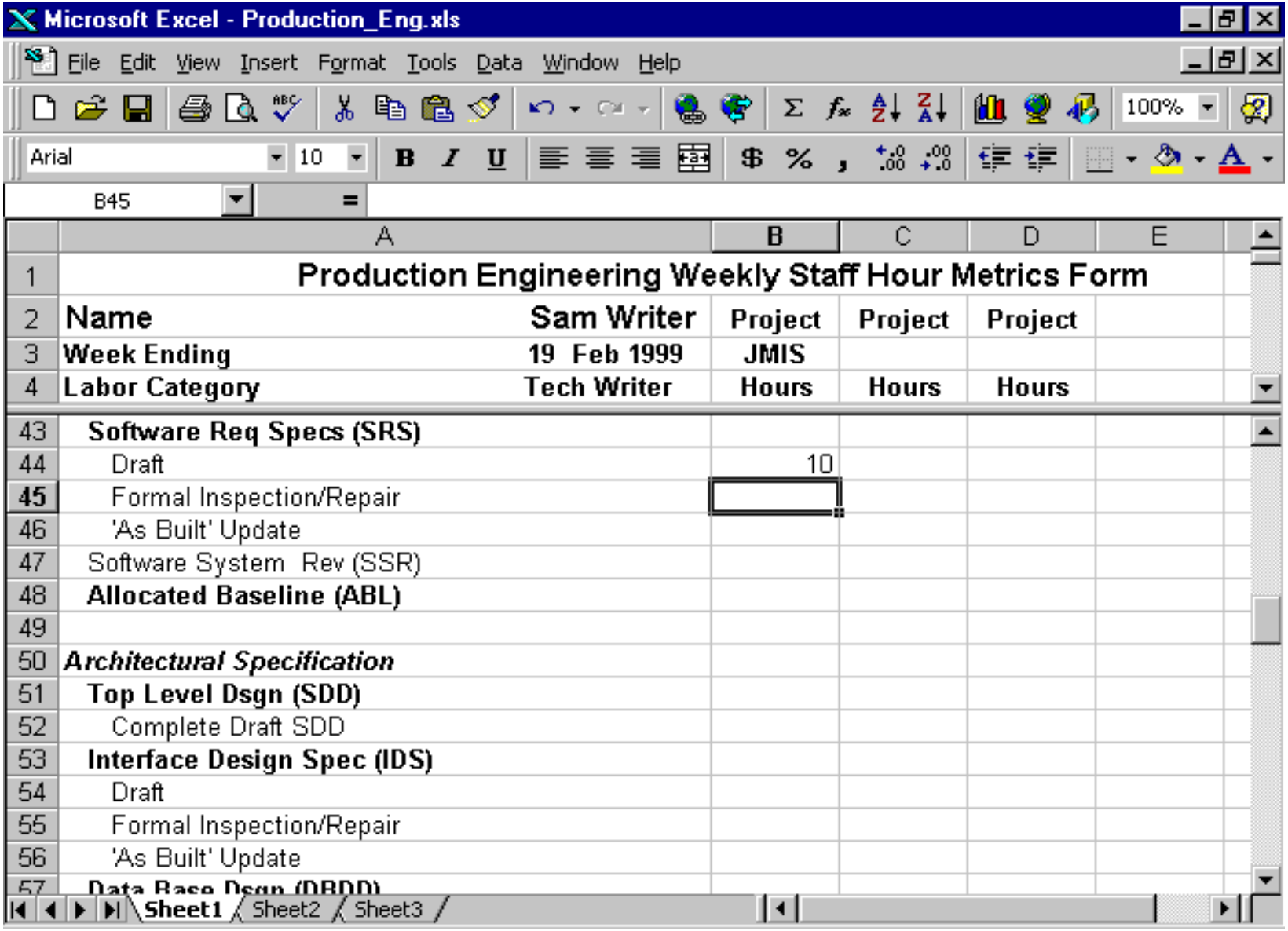


Pull down **Project** menu
Click on **Project Information**

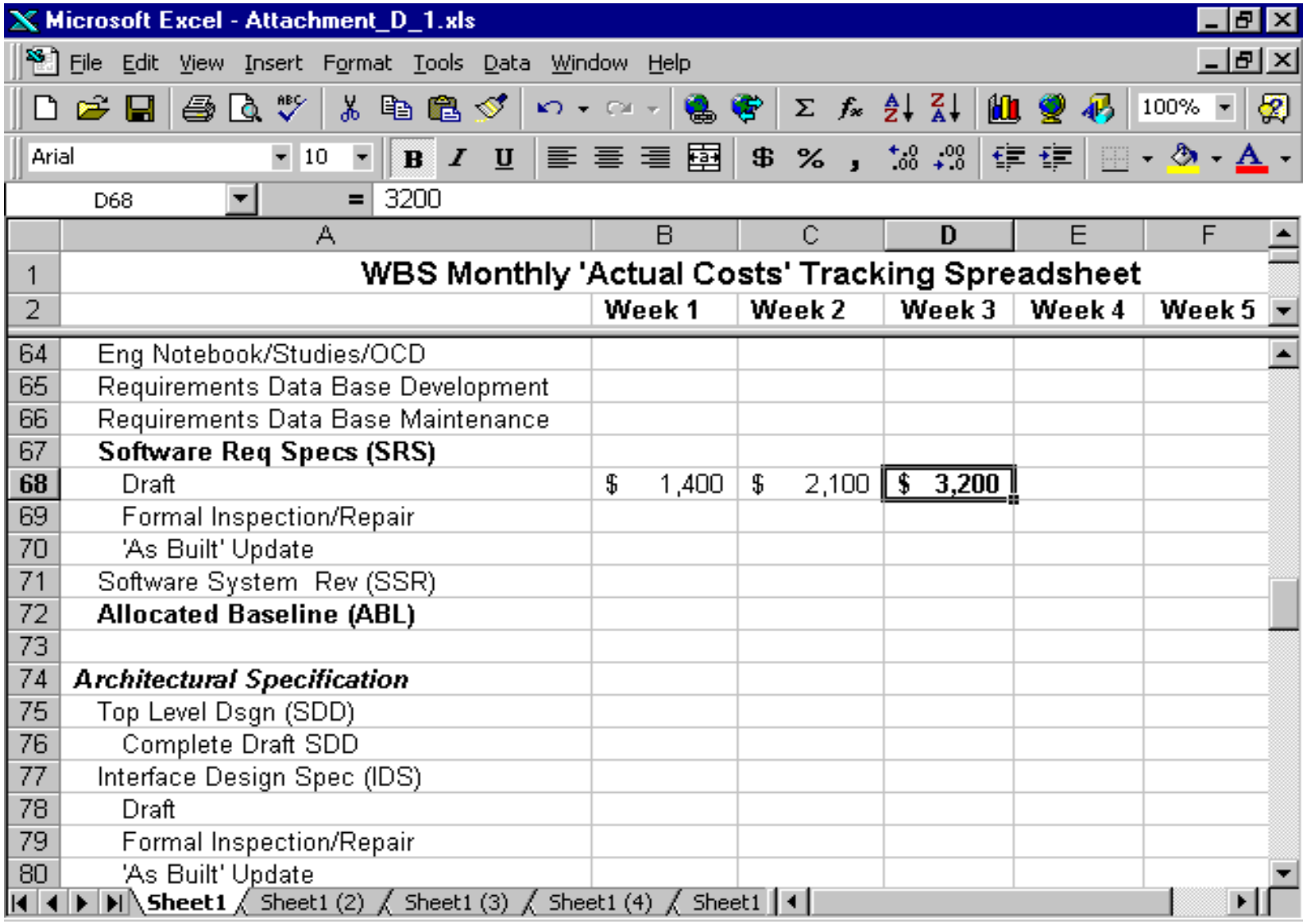
Set status date for month



SPTO Appendix A, Sample Software Measurement Pla
Attachment D - Staff Hours Metrics Form (Excel form



SPTO Appendix A, Sample Software Measurement Plan
Attachment D - Staff Hours Metrics Form (Excel format)


Microsoft Excel - Attachment_D_1.xls
File Edit View Insert Format Tools Data Window Help
Arial 10
D68 = 3200
WBS Monthly 'Actual Costs' Tracking Spreadsheet
Week 1 Week 2 Week 3 Week 4 Week 5
64 Eng Notebook/Studies/OCD
65 Requirements Data Base Development
66 Requirements Data Base Maintenance
67 Software Req Specs (SRS)
68 Draft $ 1,400 $ 2,100 $ 3,200
69 Formal Inspection/Repair
70 'As Built' Update
71 Software System Rev (SSR)
72 Allocated Baseline (ABL)
73
74 Architectural Specification
75 Top Level Dsgn (SDD)
76 Complete Draft SDD
77 Interface Design Spec (IDS)
78 Draft
79 Formal Inspection/Repair
80 'As Built' Update
Sheet1 Sheet1 (2) Sheet1 (3) Sheet1 (4) Sheet1

SPTO Appendix A, Sample Software Measurement Pl
Attachment B - WBS Monthly 'Actual Costs' Tracking

DEVELOPMENTAL STATUS

Name: ___I.M Leader_____
Date:_____

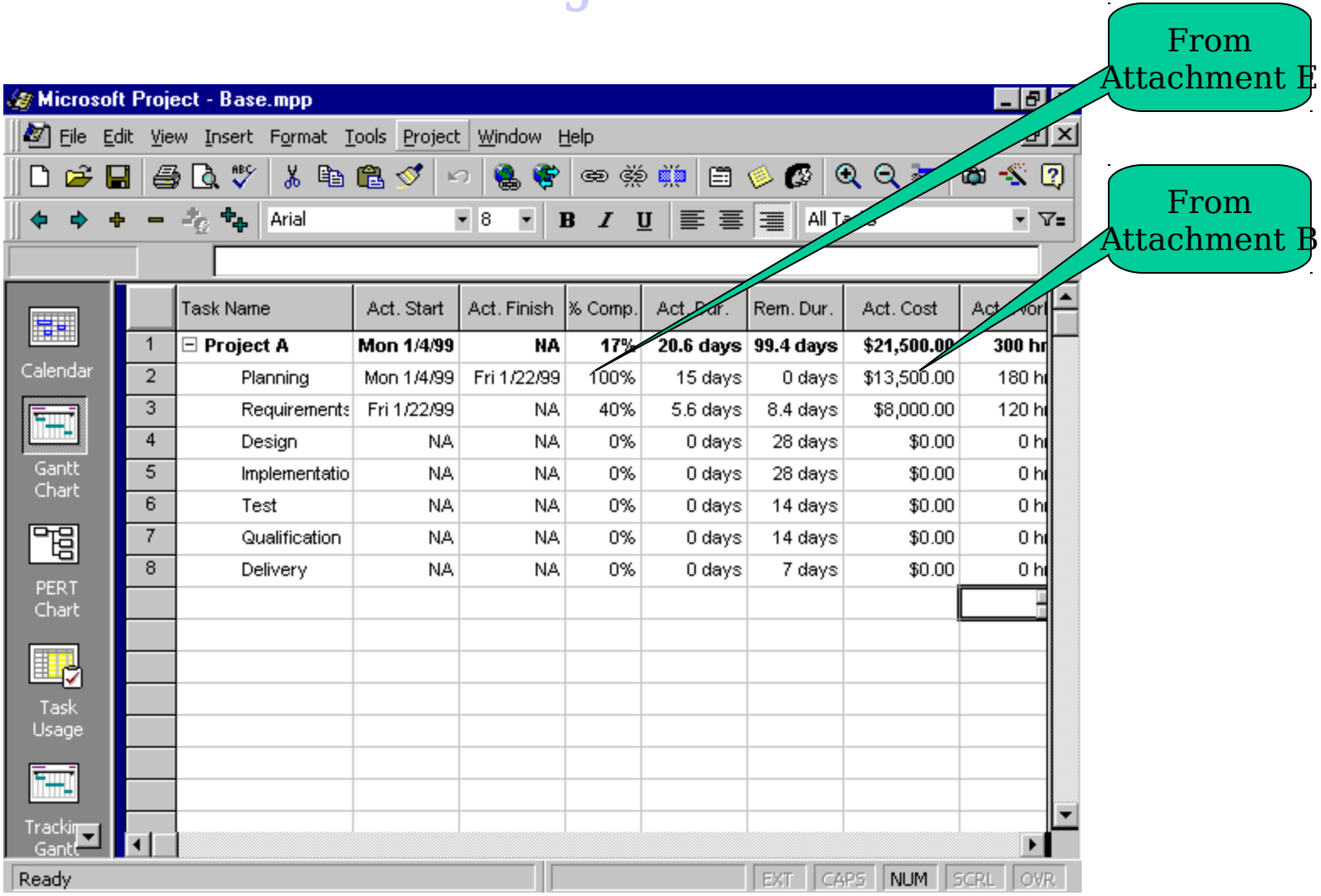
Project: _____

Developmental Task Item	Percent Complete
SRS Draft	65

Note: Percentage complete to entered based on attached Earned Value algorithms

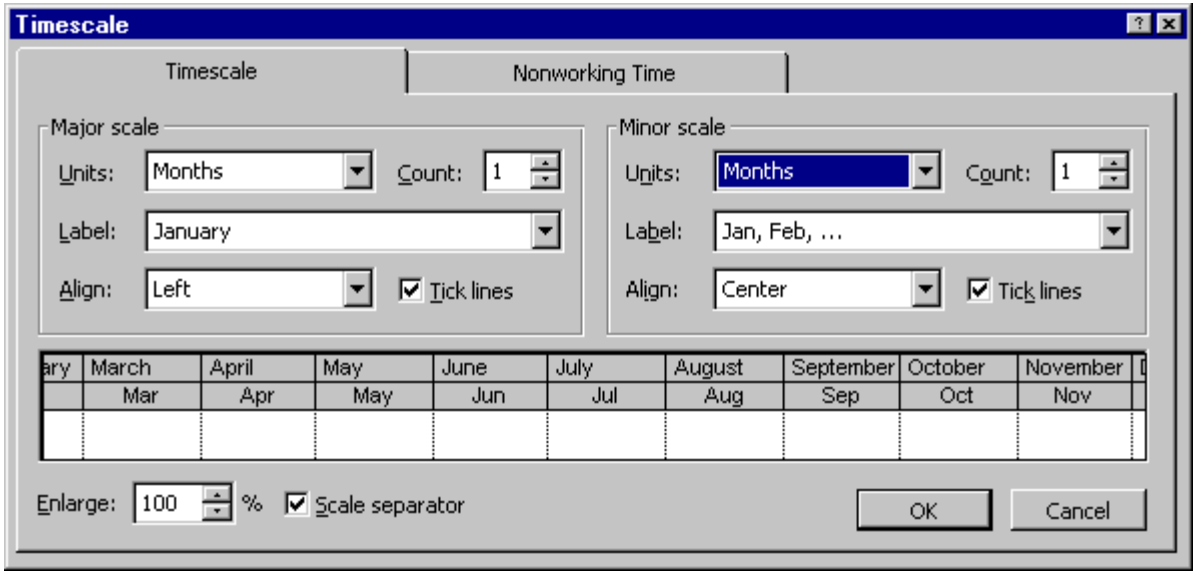
SPTO Appendix A, Sample Software Measurement Attachment E - Developmental Item Status Form (Use Earned Value Formulas attached to Form E.1)

MS Project


From Attachment E
From Attachment B
Microsoft Project - Base.mpp
File Edit View Insert Format Tools Project Window Help
Arial 8
Calendar
Gantt Chart
PERT Chart
Task Usage
Tracking Gantt
Task Name | Act. Start | Act. Finish | % Comp. | Act. Dur. | Rem. Dur. | Act. Cost
1 Project A | Mon 1/4/99 | NA | 17% | 20.6 days | 99.4 days | $21,500.00
2 Planning | Mon 1/4/99 | Fri 1/22/99 | 100% | 15 days | 0 days | $13,500.00
3 Requirements | Fri 1/22/99 | NA | 40% | 5.6 days | 8.4 days | $8,000.00
4 Design | NA | NA | 0% | 0 days | 28 days | $0.00
5 Implementatio | NA | NA | 0% | 0 days | 28 days | $0.00
6 Test | NA | NA | 0% | 0 days | 14 days | $0.00
7 Qualification | NA | NA | 0% | 0 days | 14 days | $0.00
8 Delivery | NA | NA | 0% | 0 days | 7 days | $0.00
Ready
EXT CAPS NUM SCRL OVR

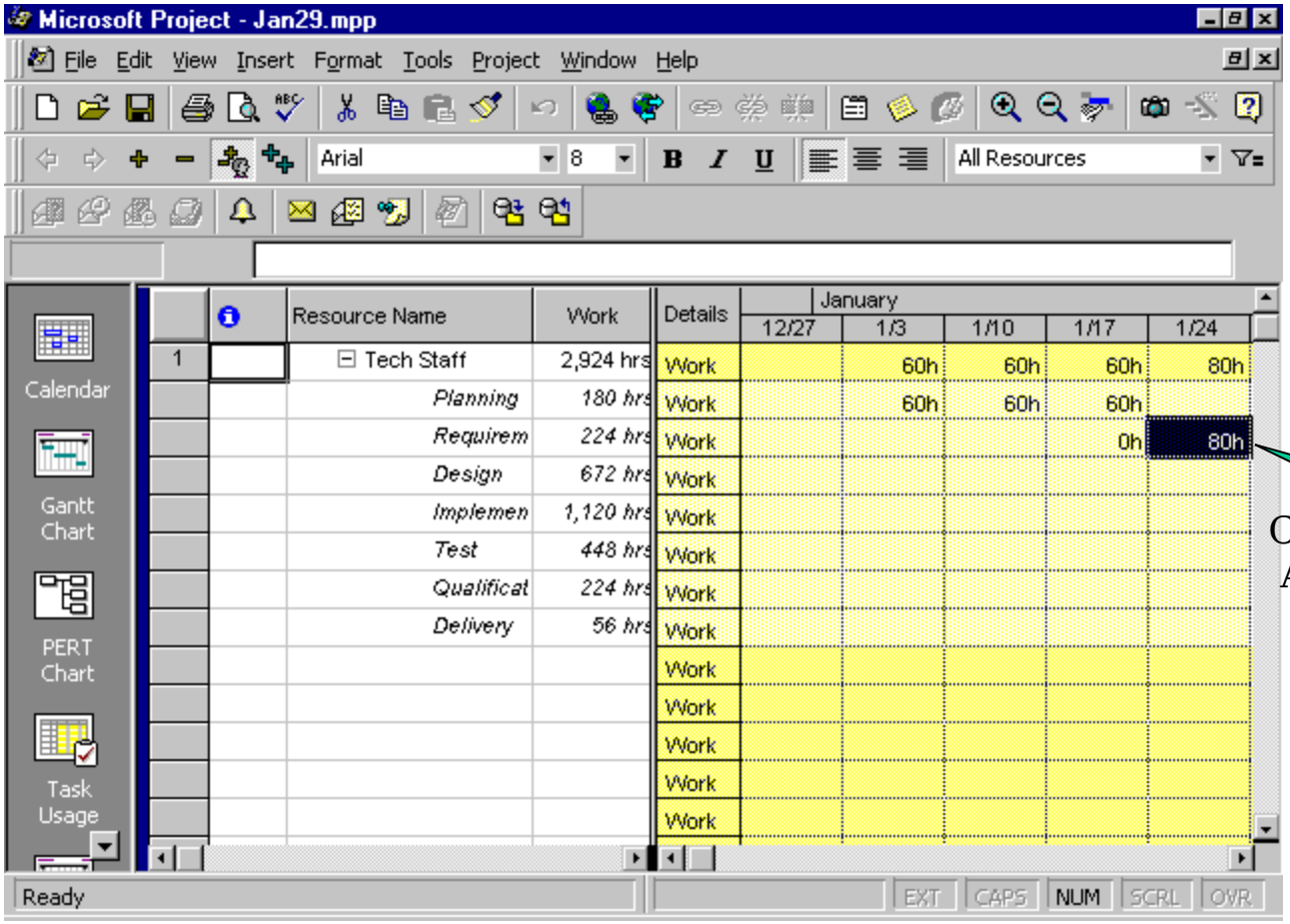
Tracking View 1/29/99

MS Project



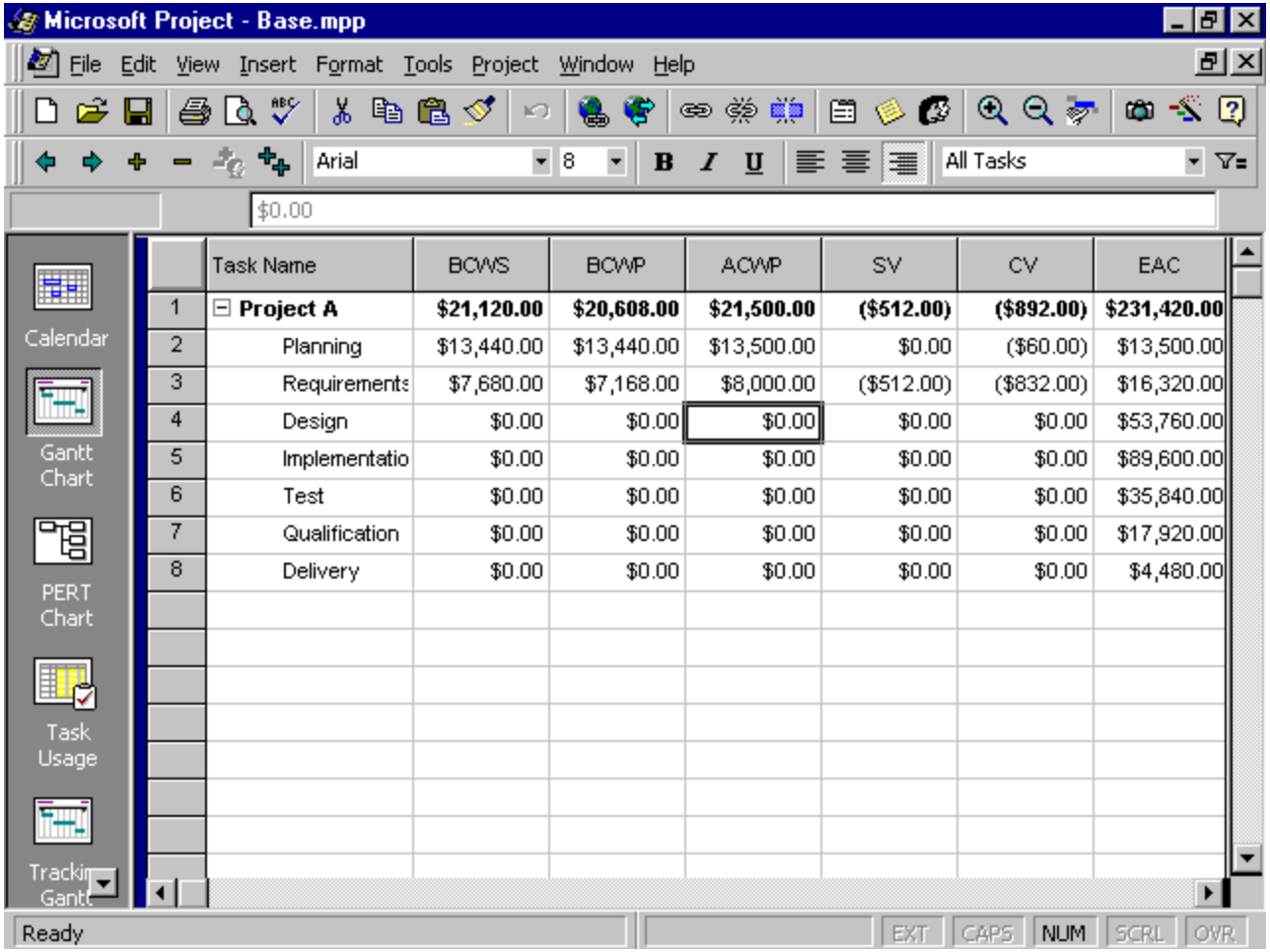
Go to **Resource Usage** View
Right click with arrow in timescale area, then
Reset **Timescale** to Months/Weeks

MS Project



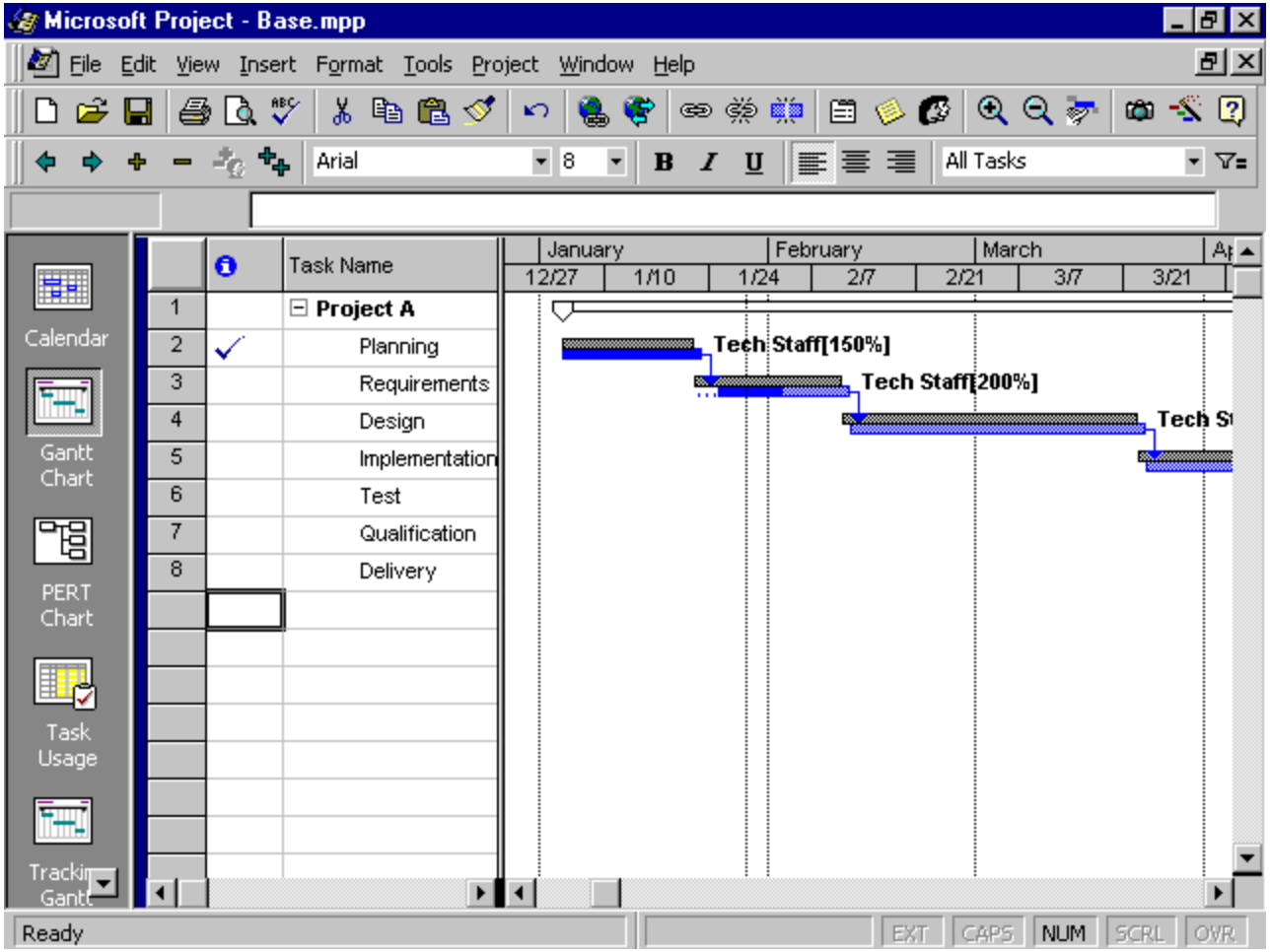
Resource Usage View 1/29/30
Timescale at Months/Weeks

MS Project


Microsoft Project - Base.mpp
File Edit View Insert Format Tools Project Window Help
Arial 8 B I U All Tasks
$0.00
Calendar
Gantt Chart
PERT Chart
Task Usage
Tracking Gantt
Task Name BCWS BCWP ACWP SV CV EAC
1 Project A $21,120.00 $20,608.00 $21,500.00 ($512.00) ($892.00) $231,420.00
2 Planning $13,440.00 $13,440.00 $13,500.00 $0.00 ($60.00) $13,500.00
3 Requirements $7,680.00 $7,168.00 $8,000.00 ($512.00) ($832.00) $16,320.00
4 Design $0.00 $0.00 $0.00 $0.00 $0.00 $53,760.00
5 Implementatio $0.00 $0.00 $0.00 $0.00 $0.00 $89,600.00
6 Test $0.00 $0.00 $0.00 $0.00 $0.00 $35,840.00
7 Qualification $0.00 $0.00 $0.00 $0.00 $0.00 $17,920.00
8 Delivery $0.00 $0.00 $0.00 $0.00 $0.00 $4,480.00
Ready
EXT CAPS NUM SCRL OVR

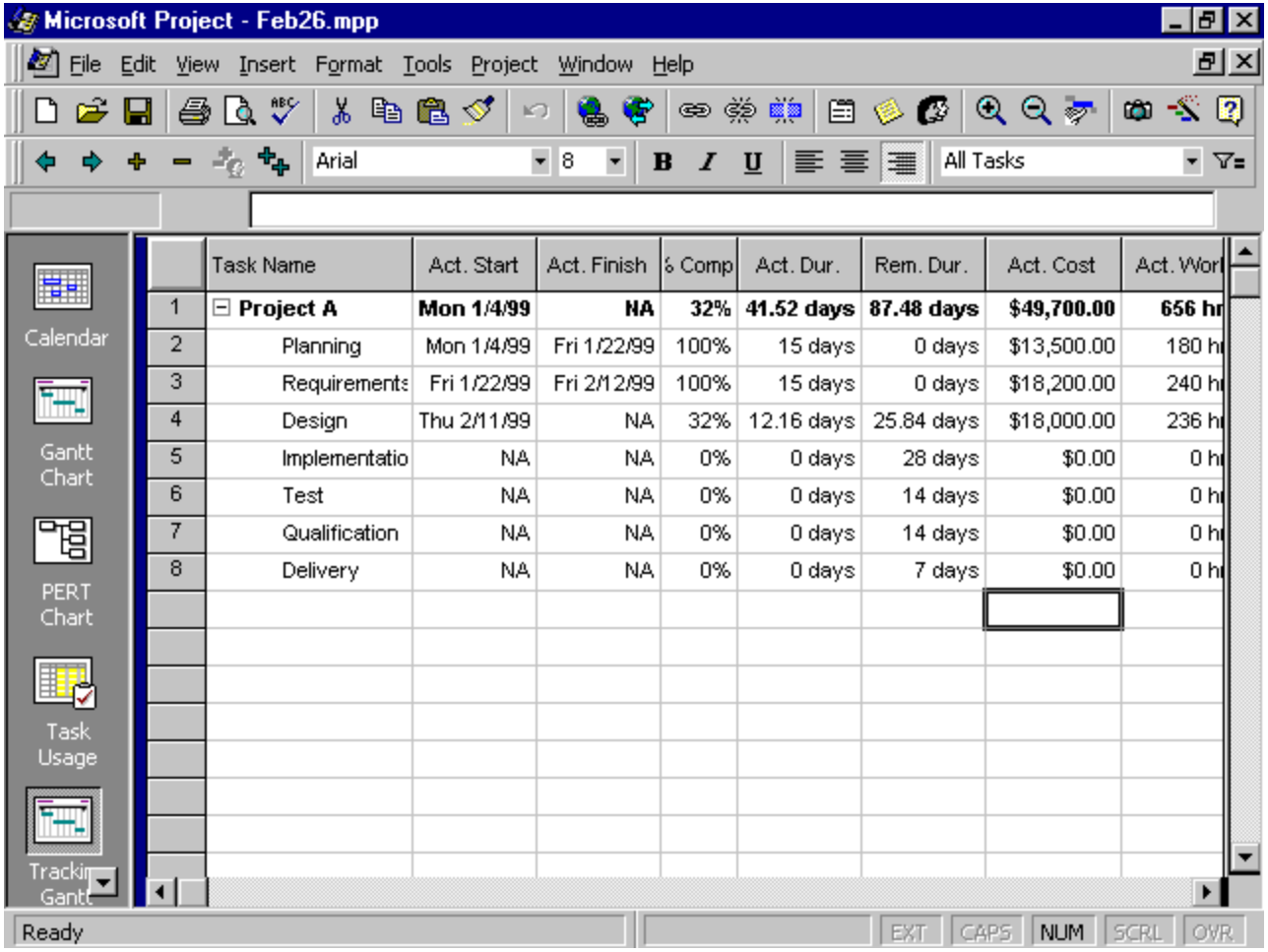
Earned Value View 1/29/99

MS Project



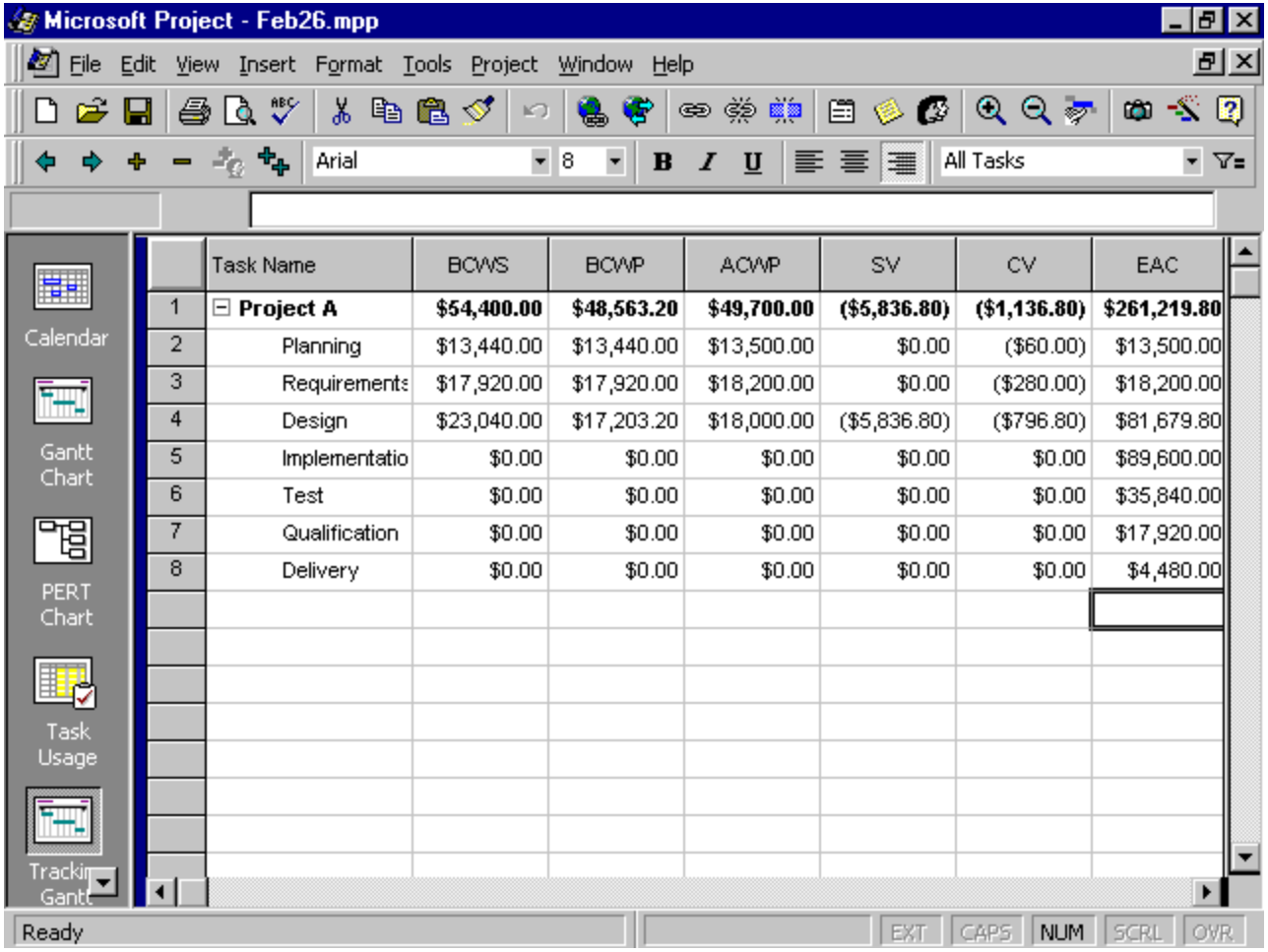
Gantt Chart View/w Baseline 1/29/99

MS Project


Microsoft Project - Feb26.mpp
File Edit View Insert Format Tools Project Window Help
Arial 8 B I U All Tasks
Calendar
Gantt Chart
PERT Chart
Task Usage
Tracking Gantt
Task Name | Act. Start | Act. Finish | % Comp | Act. Dur. | Rem. Dur. | Act. Cost | Act. Work
1 Project A | Mon 1/4/99 | NA | 32% | 41.52 days | 87.48 days | $49,700.00 | 656 hr
2 Planning | Mon 1/4/99 | Fri 1/22/99 | 100% | 15 days | 0 days | $13,500.00 | 180 hr
3 Requirements | Fri 1/22/99 | Fri 2/12/99 | 100% | 15 days | 0 days | $18,200.00 | 240 hr
4 Design | Thu 2/11/99 | NA | 32% | 12.16 days | 25.84 days | $18,000.00 | 236 hr
5 Implementatio | NA | NA | 0% | 0 days | 28 days | $0.00 | 0 hr
6 Test | NA | NA | 0% | 0 days | 14 days | $0.00 | 0 hr
7 Qualification | NA | NA | 0% | 0 days | 14 days | $0.00 | 0 hr
8 Delivery | NA | NA | 0% | 0 days | 7 days | $0.00 | 0 hr
Ready
EXT CAPS NUM SCRL OVR

Tracking View 2/26/99

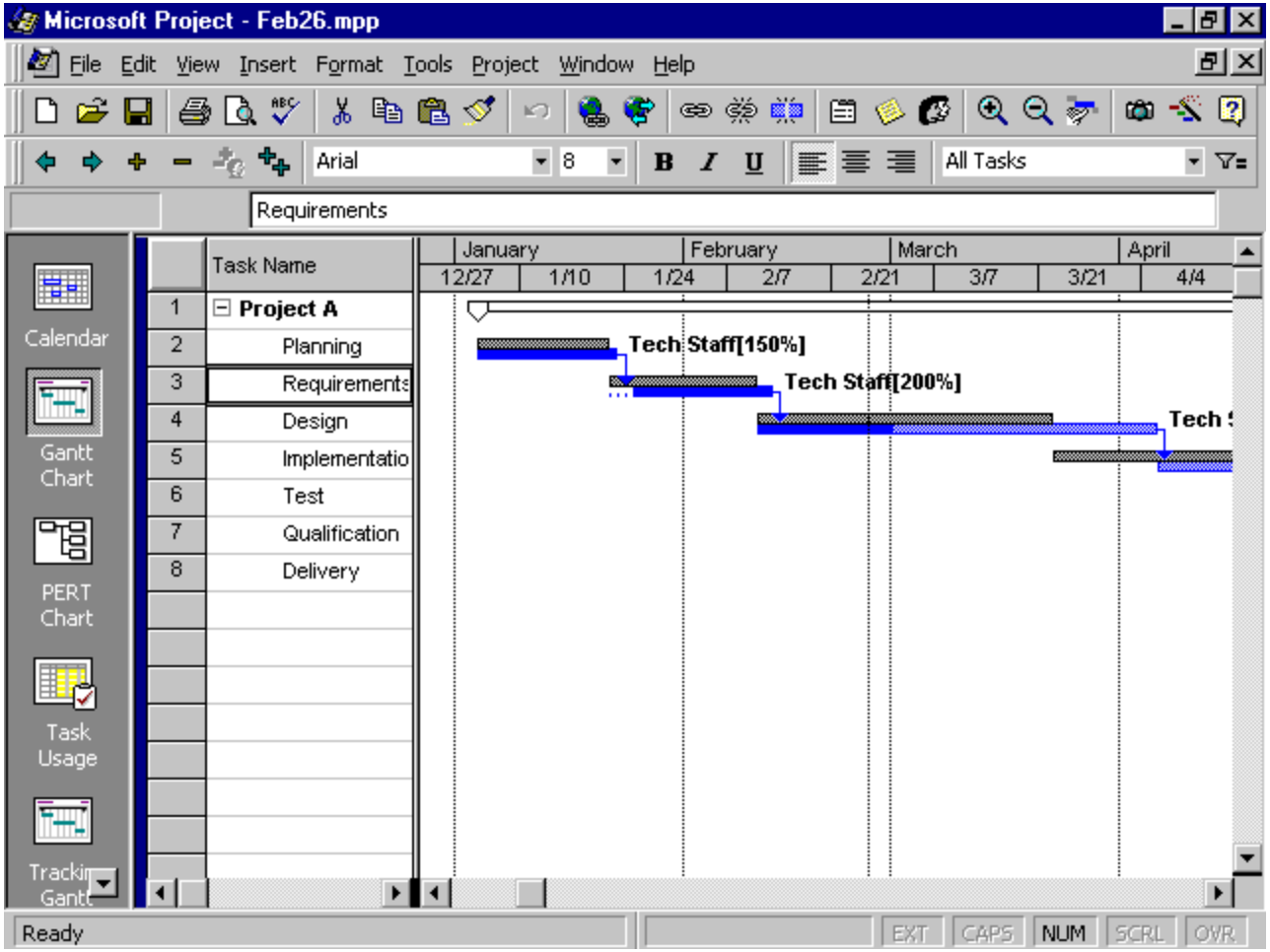
MS Project



	Task Name	BCWS	BCWP	ACWP	SV	CV	EAC
1	**Project A**	**$54,400.00**	**$48,563.20**	**$49,700.00**	**($5,836.80)**	**($1,136.80)**	**$261,219.80**
2	Planning	$13,440.00	$13,440.00	$13,500.00	$0.00	($60.00)	$13,500.00
3	Requirements	$17,920.00	$17,920.00	$18,200.00	$0.00	($280.00)	$18,200.00
4	Design	$23,040.00	$17,203.20	$18,000.00	($5,836.80)	($796.80)	$81,679.80
5	Implementatio	$0.00	$0.00	$0.00	$0.00	$0.00	$89,600.00
6	Test	$0.00	$0.00	$0.00	$0.00	$0.00	$35,840.00
7	Qualification	$0.00	$0.00	$0.00	$0.00	$0.00	$17,920.00
8	Delivery	$0.00	$0.00	$0.00	$0.00	$0.00	$4,480.00

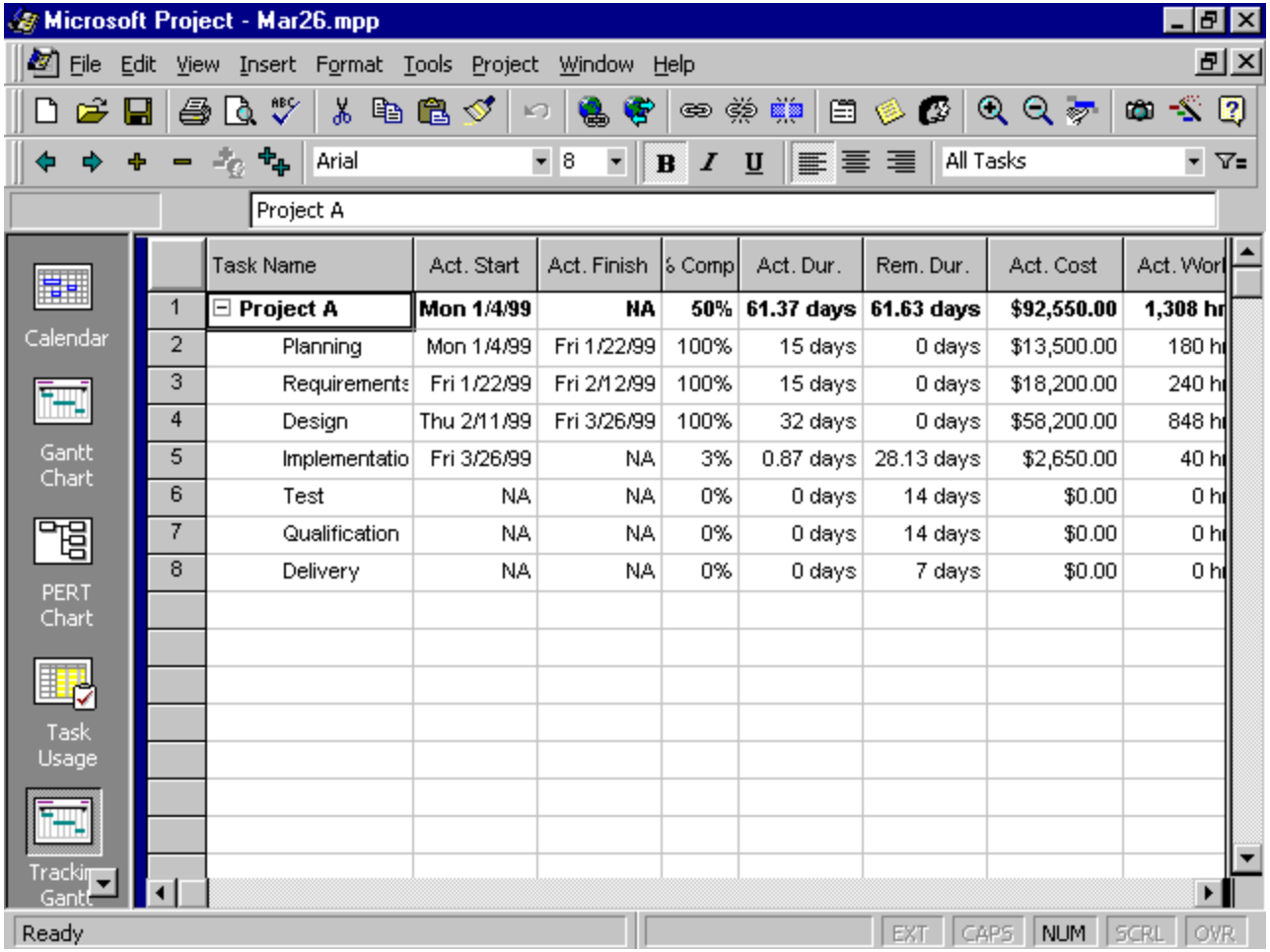
Earned Value view 2/26/99

MS Project



Gantt Chart w/Baseline 2/26/99

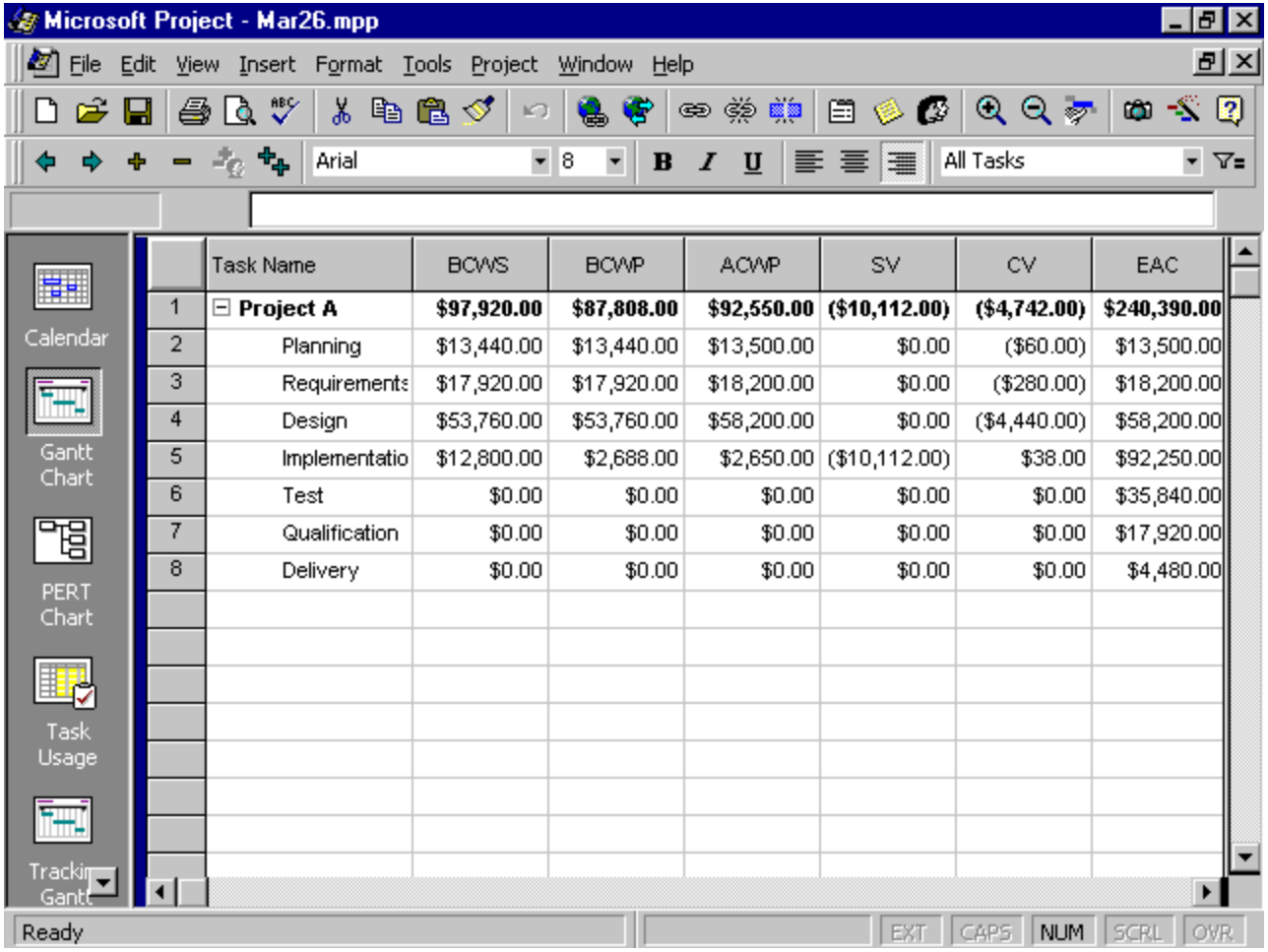
MS Project



	Task Name	Act. Start	Act. Finish	% Comp	Act. Dur.	Rem. Dur.	Act. Cost	Act. Work
1	**Project A**	**Mon 1/4/99**	**NA**	**50%**	**61.37 days**	**61.63 days**	**$92,550.00**	**1,308 hr**
2	Planning	Mon 1/4/99	Fri 1/22/99	100%	15 days	0 days	$13,500.00	180 hr
3	Requirements	Fri 1/22/99	Fri 2/12/99	100%	15 days	0 days	$18,200.00	240 hr
4	Design	Thu 2/11/99	Fri 3/26/99	100%	32 days	0 days	$58,200.00	848 hr
5	Implementatio	Fri 3/26/99	NA	3%	0.87 days	28.13 days	$2,650.00	40 hr
6	Test	NA	NA	0%	0 days	14 days	$0.00	0 hr
7	Qualification	NA	NA	0%	0 days	14 days	$0.00	0 hr
8	Delivery	NA	NA	0%	0 days	7 days	$0.00	0 hr

Tracking View 3/26/99

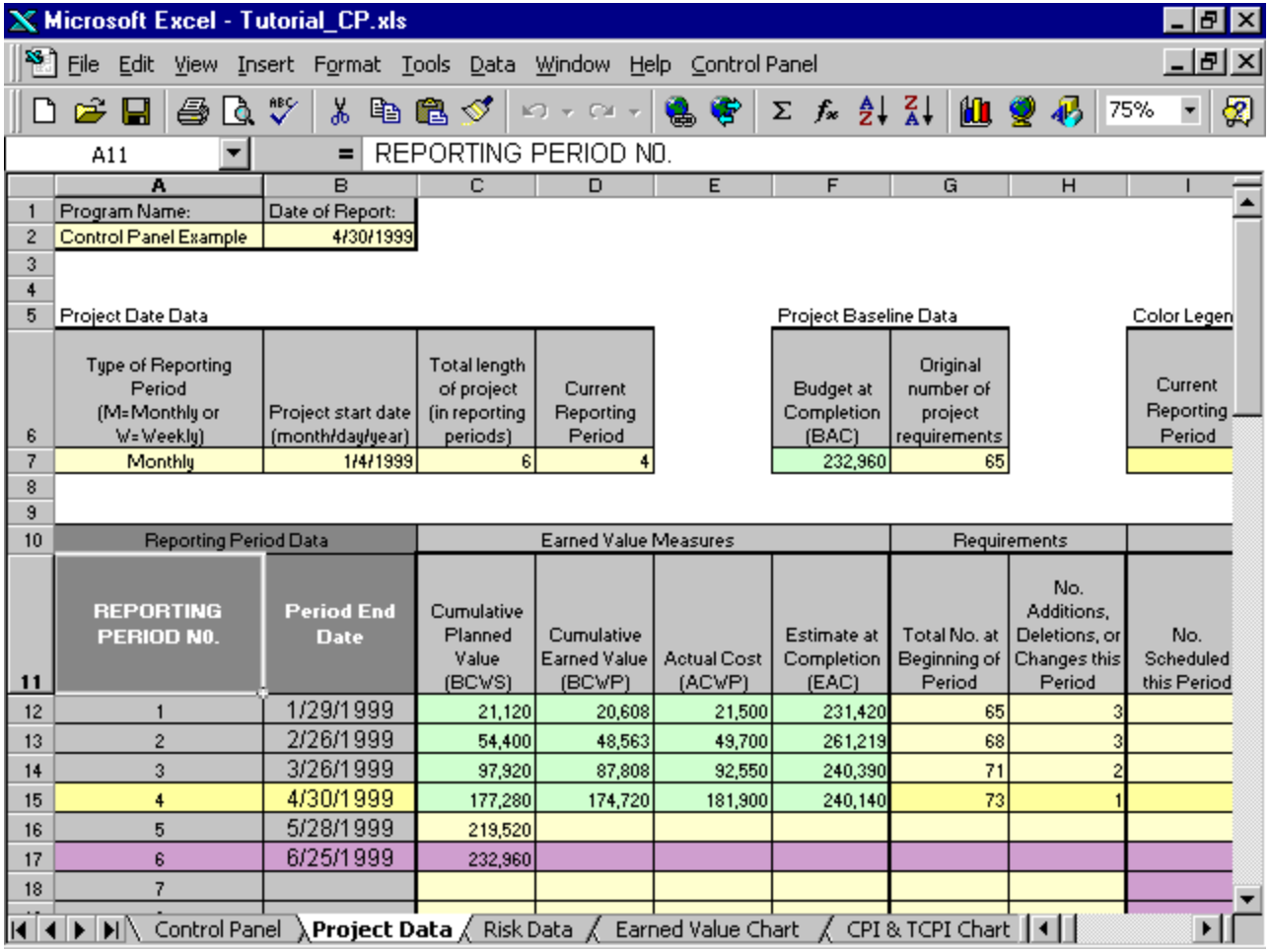
MS Project



	Task Name	BCWS	BCWP	ACWP	SV	CV	EAC
1	**Project A**	**$97,920.00**	**$87,808.00**	**$92,550.00**	**($10,112.00)**	**($4,742.00)**	**$240,390.00**
2	Planning	$13,440.00	$13,440.00	$13,500.00	$0.00	($60.00)	$13,500.00
3	Requirements	$17,920.00	$17,920.00	$18,200.00	$0.00	($280.00)	$18,200.00
4	Design	$53,760.00	$53,760.00	$58,200.00	$0.00	($4,440.00)	$58,200.00
5	Implementatio	$12,800.00	$2,688.00	$2,650.00	($10,112.00)	$38.00	$92,250.00
6	Test	$0.00	$0.00	$0.00	$0.00	$0.00	$35,840.00
7	Qualification	$0.00	$0.00	$0.00	$0.00	$0.00	$17,920.00
8	Delivery	$0.00	$0.00	$0.00	$0.00	$0.00	$4,480.00

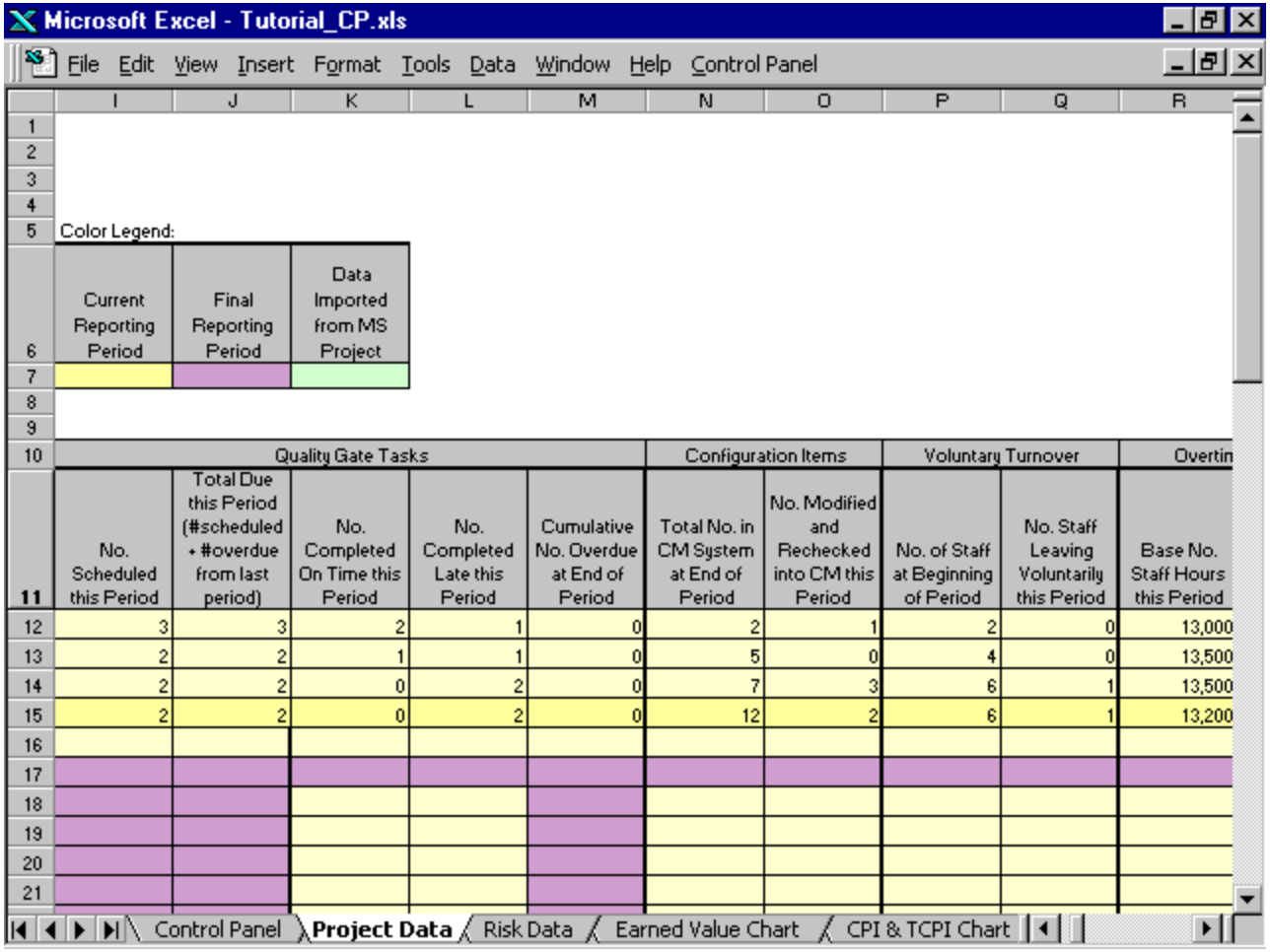
Earned Value View 3/26/99

SPMN's Control Panel



Load Attachment C, the Tracking Spreadsheet, with d
CM folks, personnel staff history, and MS Project field

SPMN's Control Panel



Microsoft Excel - Tutorial_CP.xls

File Edit View Insert Format Tools Data Window Help Control Panel

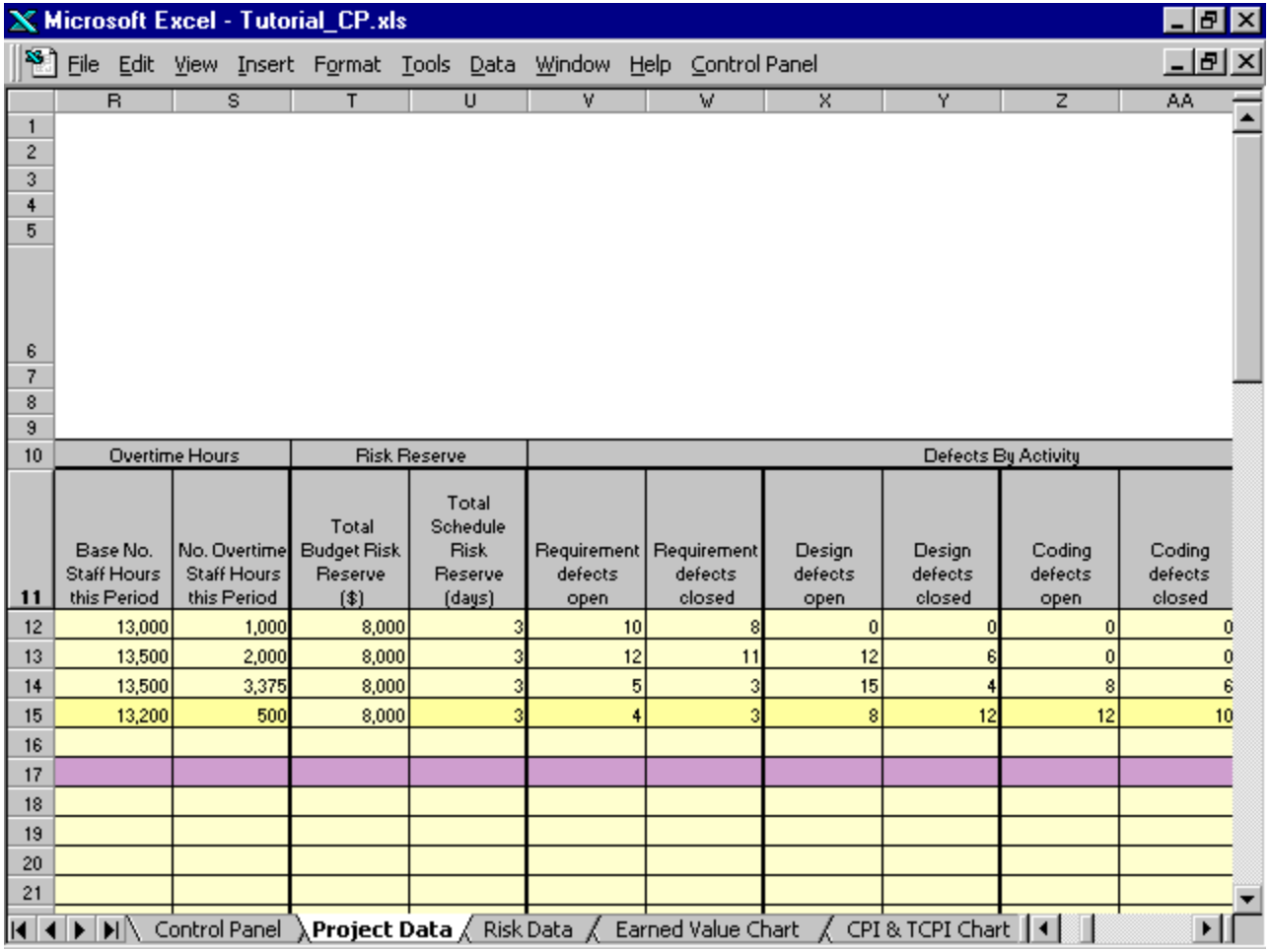
Color Legend:

Current Reporting Period	Final Reporting Period	Data Imported from MS Project

	Quality Gate Tasks					Configuration Items		Voluntary Turnover		Overtin
	No. Scheduled this Period	Total Due this Period (#scheduled + #overdue from last period)	No. Completed On Time this Period	No. Completed Late this Period	Cumulative No. Overdue at End of Period	Total No. in CM System at End of Period	No. Modified and Rechecked into CM this Period	No. of Staff at Beginning of Period	No. Staff Leaving Voluntarily this Period	Base No. Staff Hours this Period
12	3	3	2	1	0	2	1	2	0	13,000
13	2	2	1	1	0	5	0	4	0	13,500
14	2	2	0	2	0	7	3	6	1	13,500
15	2	2	0	2	0	12	2	6	1	13,200

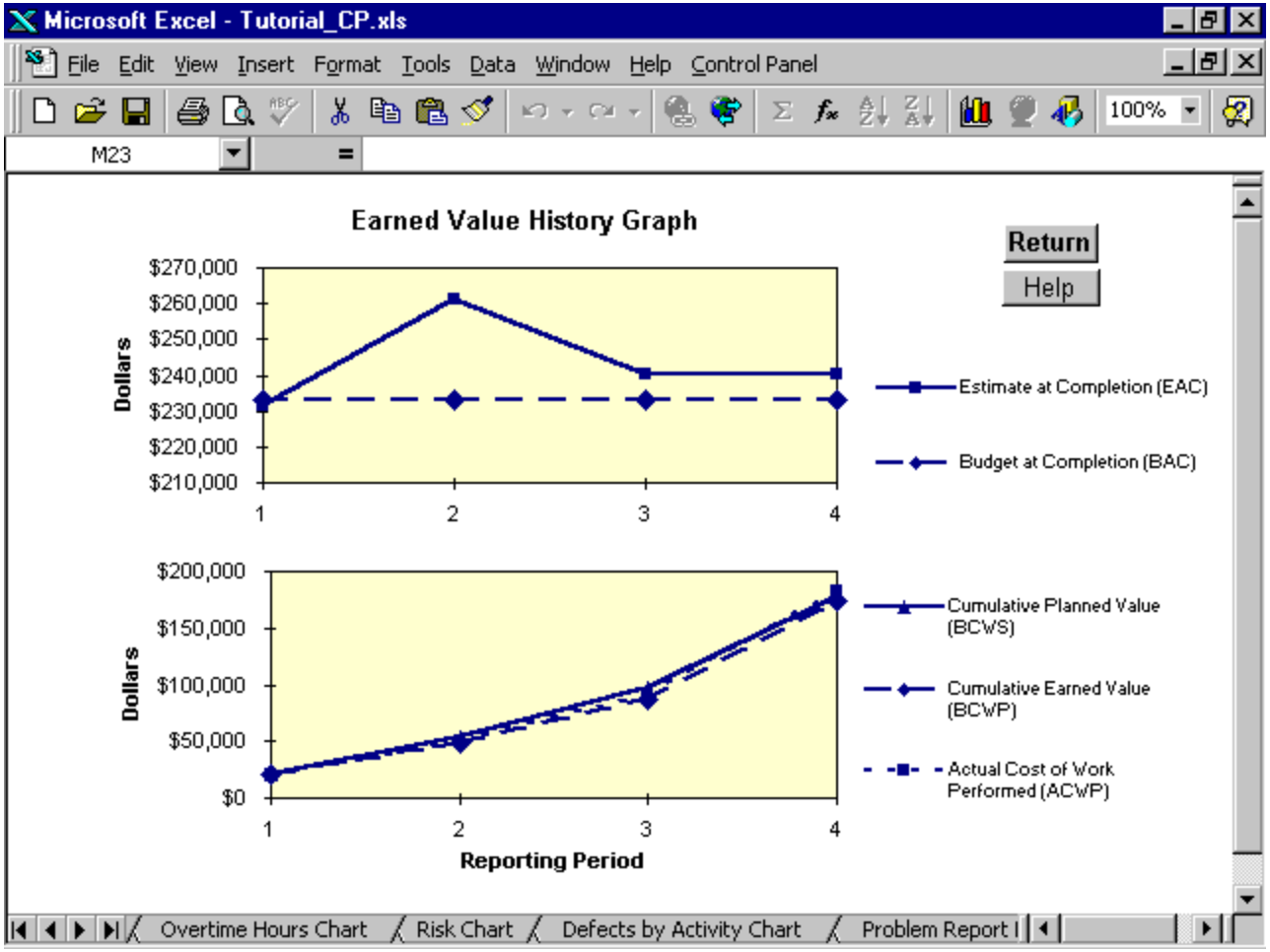
Control Panel | Project Data | Risk Data | Earned Value Chart | CPI & TCPI Chart

SPMN's Control Panel



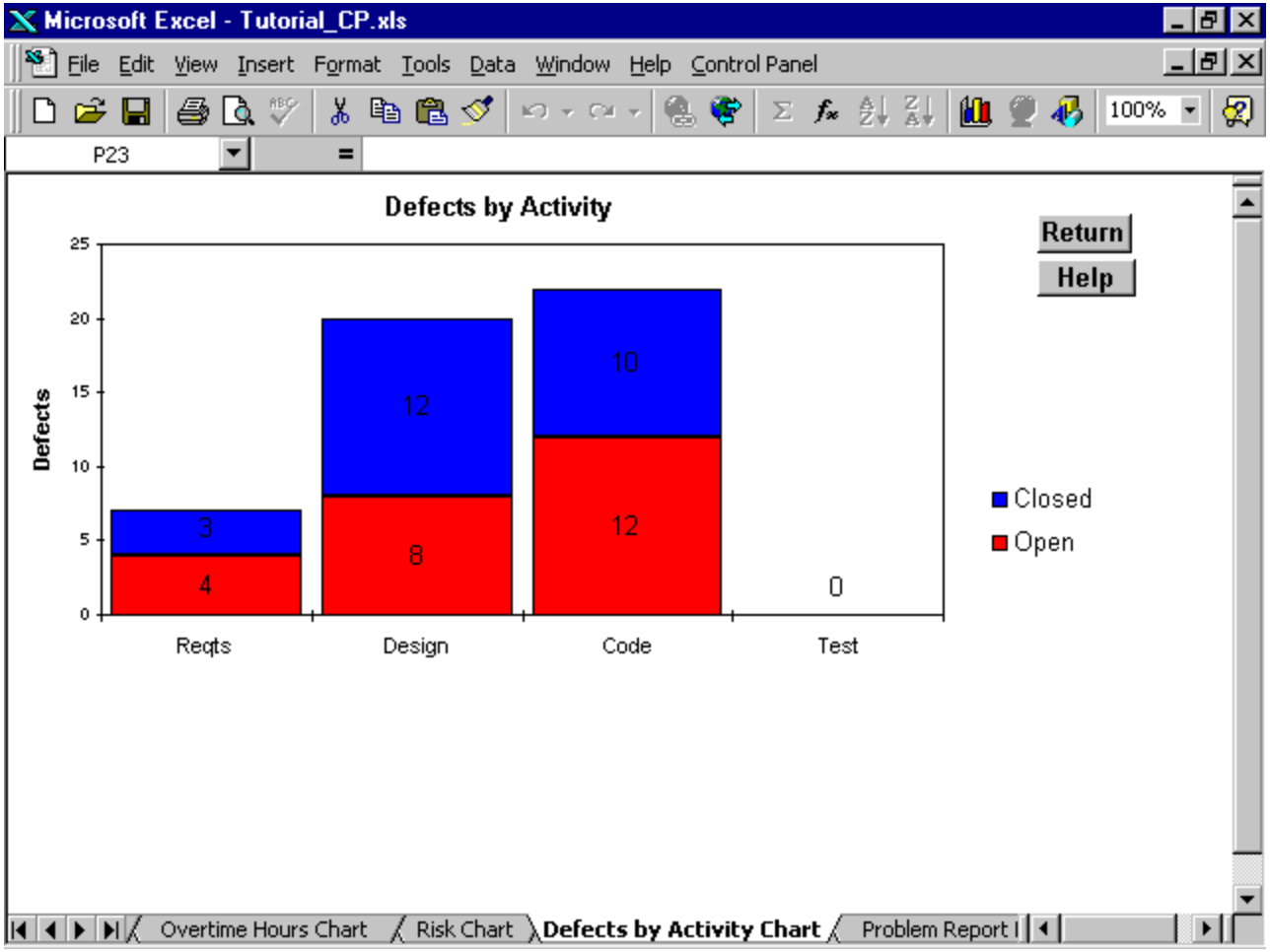
	Overtime Hours		Risk Reserve		Defects By Activity					
11	Base No. Staff Hours this Period	No. Overtime Staff Hours this Period	Total Budget Risk Reserve ($)	Total Schedule Risk Reserve (days)	Requirement defects open	Requirement defects closed	Design defects open	Design defects closed	Coding defects open	Coding defects closed
12	13,000	1,000	8,000	3	10	8	0	0	0	0
13	13,500	2,000	8,000	3	12	11	12	6	0	0
14	13,500	3,375	8,000	3	5	3	15	4	8	6
15	13,200	500	8,000	3	4	3	8	12	12	10
16										
17										
18										
19										
20										
21										

SPMN's Control Panel



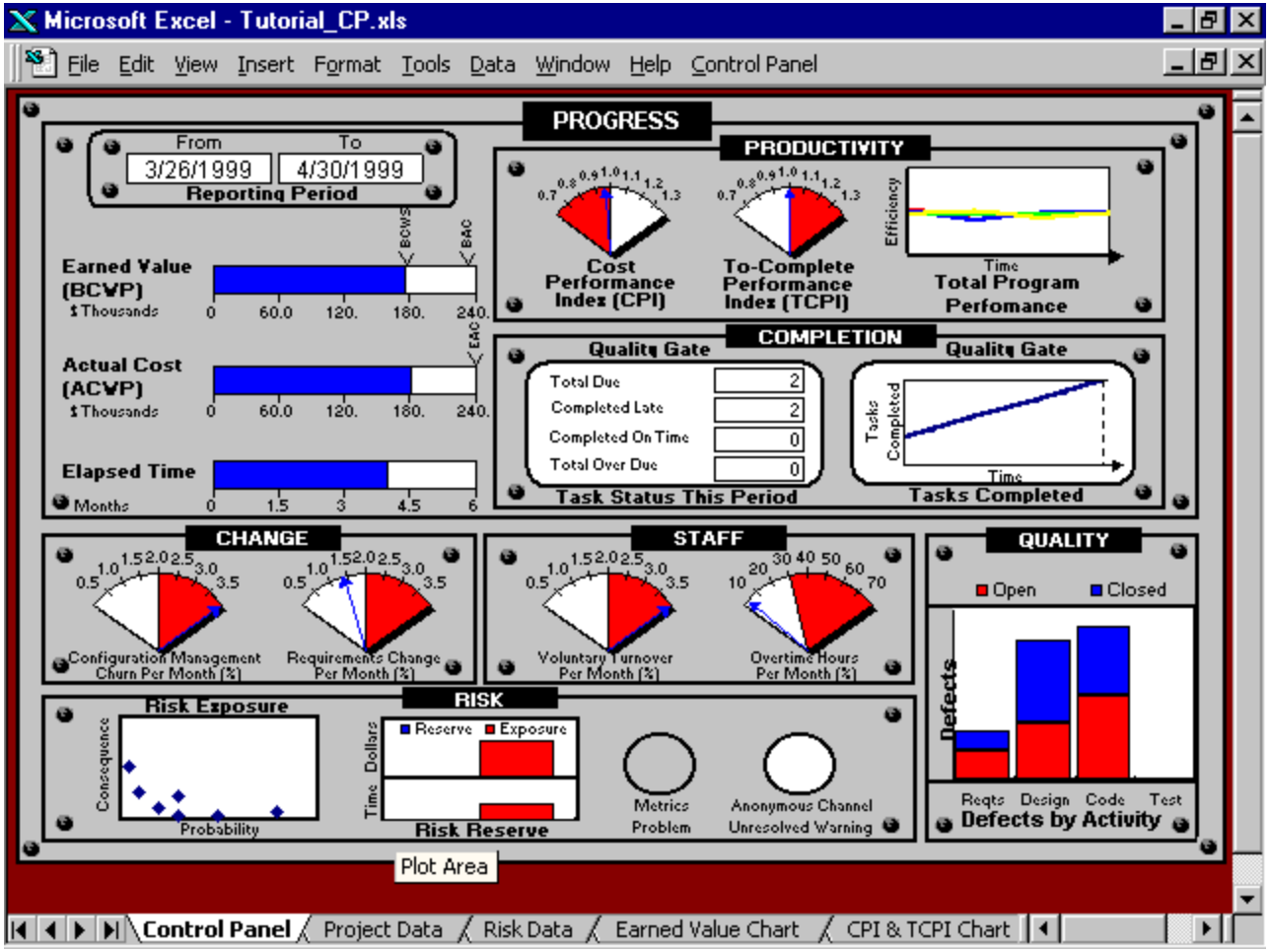
Select Charts

SPMN's Control Panel



Defects Chart from Control Panel

Or Ex Fighter Pilots Can Read -



The Control Panel

EARNED VALUE ?

JUST A PIECE OF CAKE